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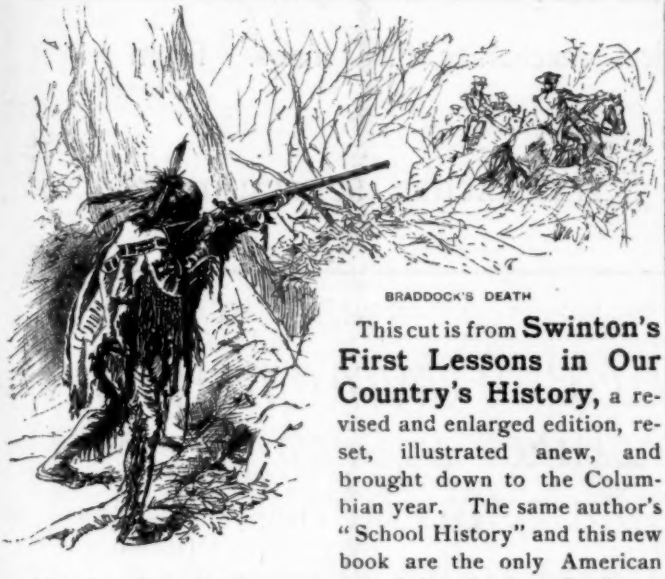

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For all other accounts	9,484,567 47
	$30,370,039 87

Assets

United States Bonds and other Securities	$72,936,322 41
First lien Loans on Bond and Mortgage	70,729,938 93
Loans on Stocks and Bonds	7,497,200 00
Real Estate	18,089,918 69
Cash in Banks and Trust Companies	10,844,691 72
Accrued Interest, Deferred Premiums, &c.	6,609,608 39
	$186,707,680 14
Reserve for Policies and other Liabilities	168,755,071 23
Surplus	$17,952,608 91

Insurance and Annuities assumed and renewed $708,692,552 40

NOTE—Insurance merely written is discarded from this Statement as wholly misleading, and only insurance actually issued and paid for in cash is included.

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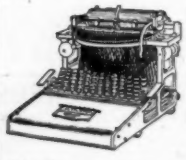

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THE SCHOOL JOURNAL

A Weekly Journal of Education.

Vol. XLVIII. For the Week Ending March 3 No 9

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The business department of THE JOURNAL is on page 226.

All letters relating to contributions should be addressed plainly, "Editors of SCHOOL JOURNAL." All letters about subscriptions should be addressed to E. L. KELLOGG & Co. Do not put editorial and business items on the same sheet.

THIS is the number of THE JOURNAL in which we consider the subject "Earth." "The earth and all that dwell thereon" (or therein) come within the scope of this study. Geography, geology, mineralogy, botany, zoölogy, are the leading sub-heads under which this most comprehensive subject may be treated. Suppose, when you have five minutes to spare "before the bell rings," you have pupils close eyes and imagine what people are doing in other parts of the earth. Then question and lead thought. For instance: "Gerald, what did you see?" "I saw some Chinese Coolies at work in the rice fields." "What do you think of that dream, Florence?" "It won't do. It's midnight in China," etc. Lead them to think of the miners at work deep down in the coal beds; of the colored laborers in the cotton-fields; of the sailors at sea, in storm and calm; of the mountaineers, guiding their mules through steep and narrow passes; of the salesmen exchanging goods for money over millions of counters; of the busy housewives at work in millions of homes; of the carpenters, sawing, planing, and hammering, and the brick-layers climbing their ladders; of the sick in homes and hospitals; of the sleeping millions on the shadowy side of the earth, resting while we work in the daylight; of the ceaseless wash of waves along coasts and the flying of storms over land and sea.

A judicious examiner does not ask questions, merely requiring the child to give just what he has received. He makes it a point to have him show in the application of his knowledge whether his instruction has been a success or a failure. "My hero in the Civil War" made the subject of a composition, is a better examination in history than questions after dates, movements of generals, number of dead and wounded, etc. It is in the application that the child shows what power he has acquired.

A school was lately visited where the teacher, a large man, sat down on the desk of a young lady, while "doing a sum"! He meant to show himself "at home" probably. In the same school the teacher seemed to prefer to sit on the corner of his own table than in his chair; one leg swinging freely! There is such a thing as school-room etiquette, and this was violated in this instance. The teacher is critically observed; he cannot escape observation. If his doings and sayings are condemned he cannot exert the influence that forms character.

Young teachers do not always speak respectfully of their supervising officers. Said one the other day: "If there is anything like a fad comes along, such as vertical writing, our principal takes it up; but he never talks to us about the philosophy of teaching, or suggests that we should take an educational paper or read a book on teaching. He won't let us try any plans of our own or allow any individuality among the children. I don't believe he knows or cares anything about the principles of education!"

The demand for the article on "The Calligraphic Renaissance," given in our issue of Feb. 10, testifies to a widespread interest in Vertical Writing. Teachers will do well to study carefully both sides of the question. It is not an easy one. One's own habits are so fixed by education that it is difficult to decide what is natural. It would seem that whatever position the body assumes, the paper should be in line with the forearm, to avoid the tendency to write up-hill. Yet the ledger is placed squarely in front of the accountant, who should be able to write easily with the book in this position. All teachers of little children tell us that it is very difficult to teach slant. Vertical writing certainly comes natural to the beginner. A school principal, who is also author of a set of copy books teaching slant writing, called at this office the other day. He is trying the vertical hand in his school. He says he wants the *best* for his pupils, whether his books are to be injured or benefited. This is the only position a conscientious teacher can take Anything that can make the path of the child easier should be welcomed. If vertical writing will not do this we shall soon know, for many are testing it.

The sympathetic teacher will do all she can to relieve the monotony of the school-room. A little variety wakes up brain action. The teacher herself becomes a victim of monotony if she follows the program from day to day and thinks of nothing else. It may be that there is lack of time, but are you sure, dear friend, that you economize time as much as is possible? How much do you think over your next day's work? Tired as you are, it will pay you to look over even the text-book lessons in advance and think up ways of brightening them—to study your program and find where you can unite two of the day's lessons in one, taking little more than half the time that they would demand if given separately, perhaps, and saving precious minutes for a class talk upon some pleasant topic, or a narration from your own experience as a traveler, or a bright bit of reading that you have picked up somewhere. Your scrap-book, your educational journal, the daily paper, are full of suggestions for such half hours of enjoyment with your pupils, and the school will soon feel the benefit of them. Break the monotony!

Science and the Schools.

By Hon. A. S. Draper.

[concluded.]

At home the child was asked not what he did in school during the day, but whether he was whipped. This with "chores" morning and afternoon, with the dearth of games and of books, and with brimstone theology, in allopathic doses, nights and Sundays and between times, made an environment which was not well calculated to ennoble the nature of the child, as it certainly was not likely to promote cheerfulness in his meditations. If substantial character afterward developed, as it very frequently did, the fact was due to other circumstances and considerations which have very largely ceased to exist. If strong manhood followed it was not because of this harsh and senseless disciplinary treatment, but in spite of it.

It brutalized the school and absorbed the productive energies of the instructor. It put the child out of teachable relations with the teacher, and scientific thought would not have it so. It was against nature; it was opposed to the truth, and it is among the eternal verities that nature and truth shall have their way. And they have been having their way, for in the person of a teacher more intelligent and better prepared, they have appealed to the reason, the affections, the ambitions, the honor; they have made study both objective and attractive; they have given the opening mind the pleasure of learning things and accomplishing things; they have helped and inspired and trusted until they have brought pupils into relations which make *teaching* practicable and into an atmosphere where teaching must be a thing of energy and power.

SCIENTIFIC TEACHING.

The old theory, if there was a theory, seems to have been that children came into the world totally depraved and terribly wicked. They must not be allowed to do things they liked to do for their ways were evil. They must not be permitted to follow the leadings of nature for fear they would get in the habit of having their own way and be spoiled. The way which was the longest and the hardest and the most unnatural was the way which had the most discipline in it, and was therefore best calculated to subjugate them in this world and educate them for the world that is to come. Indeed, that seems to have been the aim of the old schools and the earlier plan of education.

The new education proceeds upon an entirely different theory. It start with throwing the total deravity hallucination to the dogs. With Bryant it sings:

> "Innocent child and snow-white flower
> Well are ye paired in your opening hour,
> Thus *should* the pure and the lovely meet,
> Stainless with stainless, and sweet with sweet."

It keeps company with nature. It studies to learn what the truths of nature are. It gains the support of nature. It tries to assist nature. It keeps in sympathy with the real. It sees that it cannot contravene the laws of the universe, and it seeks first to understand and then obey them and make the most of them. It tries to make the child at home in the school-room. It utilizes his natural tastes and desires and fancies for his improvement. From the kindergarten to the university the instruction is alive, objective, and natural. The Almighty has implanted in every human being admiration for the beautiful. A child delights in a flower before it knows why. Scientific teaching makes the most of that fact in an infinite variety of ways. There is no fun in learning rules. Some children cannot do it at all. But all children like to *do* things and to show their handiwork. Scientific teaching does not try to overcome that fact, but seizes upon it and applies it to its own purposes in innumerable ways. When nature is allowed to have its way all children have real satisfaction in finding out facts and like to lead on from one accomplishment to another. These facts are the basis of the new plans of the schools.

The new plan commences without either the alphabet or the book. It takes the child before he can be taught to read, and the school becomes a joy and a fascination to him. While it gets possession of him and gains his confidence by methods and objects which his nature cannot resist, it exercises his muscles, sharpens his observing and perceptive faculties, and starts the habits of inquiry and investigation; it arouses his emotions and directs his affections; it quickens his eye and trains his hand; it develops his reason and stimulates his moral sense. At the very beginning it lays the foundation of a broad character and establishes habits which make intellectual versatility and power.

The men and women who developed the material resources of the land, who built up the institutions of the Republic had their childhood in an age which *did* things. Many of the boys were country boys, who cut wood, and broke steers, and mended harness, and made their own sleds; others who lived in the cities came from homes where poverty was the inspiration of industry and ingenuity, and they came by the way of a factory or a shop. The girls learned the household arts at their mothers' side and contributed their share toward the family living. In either case they were in contact with things and were where they had to use their hands. It was more of a privilege than they then thought, for it contained the elements of intellectual growth and of sturdy manhood and womanhood even more than of manual dexterity. These privileges are largely denied the youth of our day, and scientific thought has discerned this deficiency and reasoned what the consequences would be. It has remedied the loss in a way which brings new interest into the schools and strengthens all the other lines of their work. Manual training has come into the schools in these recent years and is being co-ordinated with all the other work.

Of course, we are not yet at the sunrise of the millennium morning. But we are making headway in that direction. We surely find clearer foresight, a more consistent theory and greater definiteness of purpose in the schools. They are fitting for this life, and that is a good step on the road towards preparation for the life that is to come. They aim at intellectual versatility, at productive power, at discriminating judgment, at substantial character and sound citizenship. They can hardly be charged with more. Their plans show greater maturity and more uniformity and solidity. All is not chaos. An educational *system* is being evolved.

THE STUDY OF SCIENCE.

The present age is a material and scientific one. It is unlike any which has preceded it. It did not come by conquest. It broke upon us as quietly as the dawn of a summer morning. It has witnessed a new love for nature and an added interest in her wonderful secrets and processes. It is an age of searching inquiry and close discussion. The false and the sham will be revealed; that which cannot stand discussion will go to the wall; the truth will work its way out. It is not only an age of demolition but one of accomplishment. It is an age of material development, for it is an age of constructive genius. It is an age of intellectual energy, for it is an age of disciplined thought. It is essentially an age of scientific knowledge and scientific power.

Science is the interpretation of nature. But nature is manifest in the butterfly, the squirrel, and the robin, as well as in the mammoths of the deep or the mastodons of the ancients; it is in the opening blade and the blooming flower as well as in the burning mountain and the blinding storm; it is in the rocks and shells as well as in the invisible current which drives the machinery of our factories or that other invisible force which propels the machinery of our lives. There is science for the child as well as science for the savant. The activity of the child and the wisdom of the scholar each have their uses in unfolding the secrets of science.

> "We have a secret, just we three,
> The robin and I and the sweet cherry tree,
> The bird told the tree, and the tree told me,
> And nobody knows it but just us three."

There is joy and fascination in nature, for the nature that is about us is in harmony with the nature that is within us :

"There's a blush on the fruit and a smile on the flower
And a laugh on the brook as it runs to the sea."

There is moral power in science. Who can see a dozen magnetized needles, floating on corks in a basin of water, repel each other and range themselves at equal distances apart and remain in exact equilibrium so long as the similar poles are all pointing up or down and then see the disturbance and the clashing which ensues when one of them is reversed, without thinking of what is behind all this? Who can see the earth turn under the swinging pendulum without knowing that this did not come by accident or chance, and without revering the Power which controls this motion and holds the spheres upon their courses?

There is intellectual awakening in the study of science. No one can engage in it without acquiring the habit of inquiry and investigation; no one can be under its spell without thought which is original; and these are the principal instrumentalities of the New Education.

Scientific investigation, above almost any other work that can be taken up in the school-room, is promotive of cordial relations between teacher and pupil. They work together for a common end—and that end is the truth. They are in harmony with a common object, and therefore in harmony with each other. The tension is removed, the problem of management is reduced in its proportions if not entirely eliminated, and teachable relations are established between teacher and child, and enthusiasm carries them on. Then we begin to realize how much more may be accomplished when instructor and pupil help each other, than when indifference prevails, or when they wear each others' lives with bitterness, or mechanically observe only the requirements of an armed truce.

THE SCHOOLS AND THE PEOPLE.

The schools must be kept in touch with the life of the people. That life is broader than it used to be. It is greater in volume and the current is swifter than in the days of our fathers. Interests and employments have multiplied many fold. Methods have changed. Energy has intensified. Intelligence has broadened marvelously. Æsthetic taste has grown. The life of the people has followed the leadings of nature. Nature is not depraved. It does not lead the great mass the wrong way. This may not be wholly within the limits of old-time theological dogma; then dogma may have to suffer some amendments. It is easier to change what men have written than to turn the mighty current of human life from its channel. In any event, the life of the world has been liberalized. The truth is being liberated. Eighteenth century schools will not fit twentieth century life. The mathematical drill alone of the old schools will not suffice for the new. Training which answered for the narrow life of the past would be wholly inadequate for the swelling life of the present and the future. The schools must train for intellectual alertness.

The schools cannot specialize. They may incidentally train artists, they may incidentally train mechanics, they may incidentally train engineers and diplomats; they must *surely* train thinkers. They must train all the children of the people so that, within personal circumstances and inclinations, all will have an equal chance. As the mass will not remain through the whole course, because their labor is necessary for bread, as the more a child is trained the better he can think and do and take care of himself, the schools must put the most care upon the work of the first years. From the first year to the last, the work must rest upon a scientific basis and be in the hands of artists if they can be procured or developed. It must be of a nature and it must employ methods which will germinate intellectual versatility and power. In healthful co-operation with the church and the home, the school must train for manly and womanly character and independence. Then as the river gains strength and impetus and majesty from tributary streams as it runs to the sea, so will the mighty current of human life be enriched and energized by the work of the schools as it runs on to that final destiny where life and nature and the truth will be in entire harmony and accord.

THE TEACHER MUST GO FORWARD.

Three hundred and sixty-five thousand teachers instruct fourteen millions of children in the public schools of the United States. If this great fraternity will think upon the movements of the dead centuries toward a higher life; if it will keep in sympathy with nature; if it will seek a clearer understanding of the leadings of the overruling Power in the world; if it will have a larger interest in scientific study: then, it will have a deeper reverence for scientific truth; it will realize the assurance of Coleridge that "as we strive to ascend in the striving;" it will see an unwonted meaning in the words of a greater than Coleridge who said, "And ye shall know the truth and the truth shall make you free."

Arouse Thought.

A student graduated from the New Jersey normal school, and went away to teach; he soon wrote to Dr. Hasbrouck that he had had such difficulty with unreasonable parents that he thought of going elsewhere. Being asked to write what the difficulty was he said that the pupils would have water passed around four times each day, and that the parents upheld them in this.

Principal Hasbrouck replied that he must *arouse the pupils to think* about the interruption coming from this operation; that if he could get them to see it as he saw it, there would be no more passing of water.

In a month, the teacher wrote again and said the school was perfection; that the children had asked to have the passing of water suspended, and the parents agreed with them.

He let the matter go on without interruption, but appointed a time to have a general discussion as to how long a pupil could do without water before suffering, and whether, if a pupil drank before the beginning of the study period, he would really need any before the close. He spoke of people sitting at churches and at theaters for two hours and more, and not thinking of having water passed around. He did that wise thing to lead the pupil to set up a standard of action, without regard to the mere authority of the teacher to become an authority for himself. He was led to think as to the proper course of action for himself under the circumstances. Arbitrary rules may obtain order, but they do not develop the pupil's mind.

"Moving bodies have a natural tendency to come to a stop," said schoolmen. "Why?" "Because they do." "Some boys have a natural dislike of books and study," our sage teachers have been saying. "Why?" "Because they don't like them." As a patient study of the facts has brought to light the truth that not the moving body, but the conditions to which it was subject were responsible for its stopping, so it may be that this "natural disinclination to study" is not natural at all, but due entirely to the fact that we have not supplied the right conditions, that we have not brought the mind into contact with the kinds of facts fitted to arouse its interests.

—*J. P. Gordy.*

When our teachers combine the excellent spirit of the Indianapolis teacher with the technic of the German schoolmaster, America will have the best schools in the world. To exchange our spirit for the German's technic, would, I think, be taking a backward step. We must not be content until we have both.—*Dr. J. M. Rice.*

The School Room.

FEB. 24.—LANGUAGE, THINGS, AND ETHICS.
MAR. 3.—PRIMARY.
MAR. 10.—NUMBER, SELF, AND EARTH.
MAR. 17.—PEOPLE AND DOING.

Number Work in Nature Study.

THE SKELETON.

By WILBUR S. JACKMAN, Cook County Normal School.

In the study of physiology, an important feature is the proportions of the various parts. These rest primarily upon the relations which exist between the different parts of the skeleton. Where the school does not possess a skeleton a good many approximate relations may be learned by measuring the different parts of the body between the points where the bones come nearest the surface. It is easy to get old bleached bones of some of the common animals and to prepare skeletons of such, as the chicken, frog, and mouse. To do the latter it is only necessary to cut away carefully as much of the flesh as possible without injuring the bones or joints and then by soaking in water, which should be frequently changed, the remainder of the flesh may be scraped and picked away. If the ligaments are so broken that the bones come apart at the joints, they may be sewed to a sheet of cardboard. This is really the most convenient form in which to have them for measuring.

For measuring the small bones a pair of dividers and a ruler are the most convenient. For the longer bones calipers are almost a necessity. These may be made thus: clamp or screw at right angles to the end of a meter-stick (or yard-stick graduated to eighths of an inch), a straight-sided stick about ten centimeters (five inches) long. In making a measurement the bone or part should lie on the meter-stick with the end resting against the upright. The length may then be read off by placing a ruler at right angles to the stick and against the other end of the part. A better way, however, is to attach a movable upright or "jaw" to the stick by means of a mortise or clamp so that it will slide back and forth smoothly and the part to be measured will then lie between this and the end piece.

Of course this study must not stop with the mere measurements and comparison of the different parts; this is but the beginning. The interpretation of the relations is most important and this is to be found in a study of the life and habits of the animal as determined by its environment. This is the central thought in the study; the problems given are designed to assist the pupil in reaching definite ideas.

Appended are a few measurements of the corresponding parts of a human skeleton and a medium sized, but full grown frog:

	Human Skeleton.	Frog's Skeleton.
Length of Humerus,	30.5 cm.	1.6 cm.
" " Forearm,	24.5 "	1.0 "
" " Carpus,	3.0 "	0.2 "
" " Metacarpals,	6 2 "	0 9 "
" " Longest finger,	10.5 "	0.8 "
" " Whole arm,	74.7 "	4.5 "
" " Femur,	39 0 "	2.8 "
" " Tibia,	31.5 "	3.2 "
" " Tarsus,	10.5 "	1.7 "
" " Longest metatarsal,	7.5 "	1.3 "
" " " toe,	6.0 "	2.1 "
" " Foot,	24.0 "	5.0 "
" " Leg, entire,	75.0 "	11.0 "
" " Vertical diameter of skull,	13.5 "	0.3 "
" " Dorso-ventral diam. of skull	17.0 "	1.4 "
" " Transverse " " "	13.5 "	0.4 "
" " " " " chest,	23.5 "	1.5 "
" " Dorso-ventral " " "	20.5 "	1.5 "
" " Spinal column,	64.5 "	5.0 "
" " Trunk, including skull	75.9 "	6.3 "
" " Sacrum,	8.5 "	2.8 "

I. FRACTIONS.

Problems.—

1. The length of the forearm in the human skeleton is what part of the length of the humerus? In the frog?
2. The humerus is what part of the length of the entire arm in the human skeleton? In the frog?
3. The forearm (to the wrist) is what part of the length of the whole arm in the human being? In the frog?
4. The length of the longest finger equals what part of the length of the entire arm in the human skeleton? In the frog?
5. The metacarpals in the human hand equal what part of the length of the arm? In the frog?
6. The femur equals what of the length of the leg in the human skeleton? In the frog?
7. The tibia equals what part of the length of the leg in the human skeleton? In the frog?
8. The length of the tarsus equals what part of the length of the leg in the human skeleton? In the frog?
9. The length of the foot equals what part of the length of the leg in the human skeleton? In the frog?
10. The length of the longest toe in the human skeleton equals what part of the length of the foot? In the frog?
11. The length of the arm equals what part of the length of the leg in the human skeleton? In the frog?
12. The length of the humerus in the human skeleton equals what part of the length of the femur? In the frog?
13. The length of the forearm in the human skeleton equals what part of the length of the tibia? In the frog?
14. The length of the hand in the human skeleton equals what part of the length of the foot? In the frog?
15. The longest finger equals what part of the length of the longest toe in the human skeleton? In the frog?
16. The length of the carpus equals what part of the length of the tarsus in the human skeleton? In the frog?
17. The length of the metacarpals equals what part of the length of the metatarsus in the human skeleton? In the frog?
18. The vertical diameter of the skull equals what part of the dorso-ventral diameter in the human skeleton? In the frog?
19. The vertical diameter of the skull equals what part of the transverse diameter in the human skeleton? In the frog?
20. The dorso-ventral diameter of the skull equals what part of the head and trunk in the human skeleton? In the frog?
21. The spinal column equals what part of the length of the head and trunk in the human skeleton? In the frog?
22. The sacrum equals what part of the length of the spinal column in the human skeleton? In the frog?
23. The length of the arm equals what part of the length of the spinal column in the human skeleton? In the frog?
24. The length of the leg in the human skeleton equals what part of the length of the spinal column? In the frog?
25. The dorso ventral diameter of the chest equals what part of the transverse diameter in the human skeleton?

II. RATIO.

1. The length of the humerus bears what ratio to the length of the arm in the human skeleton? In the frog?
2. The length of the forearm in the human skeleton bears what ratio to the length of the arm? In the frog?
3. The length of the forearm bears what ratio to the length of the humerus in the human skeleton? In the frog?
4. What is the ratio of the length of the hand and carpus in the human skeleton to the length of the arm? In the frog?
5. What is the ratio of the length of the longest finger in the human skeleton to that of the arm? In the frog?
6. What is the ratio of the length of the femur in the human skeleton to the length of the leg? In the frog?
7. What is the ratio of the length of the tibia in the human skeleton to the length of the leg? In the frog?
8. What is the ratio of the length of the foot in the human skeleton to the length of the leg? In the frog?
9. What is the ratio of the length of the tarsus in the human skeleton to the length of the leg? In the frog?
10. What is the ratio of the length of the metatarsus in the human skeleton to the length of the leg? In the frog?
11. What is the ratio of the length of the tibia to the length of the femur in the human skeleton? In the frog?
12. What is the ratio of the length of the tarsus in the human skeleton to the length of the foot? In the frog?
13. What is the ratio of the length of the foot in the human skeleton to the length of the tibia? In the frog?
14. What is the ratio of the length of the foot in the human skeleton to the length of the femur? In the frog?
15. What is the ratio of the length of the humerus in the human skeleton to the length of the femur?
16. What is the ratio of the length of the forearm to the length of the tibia in the human skeleton? In the frog?
17. What is the ratio of the length of the hand in the human skeleton to the length of the foot? In the frog?
18. What is the ratio of the length of the carpus to the length of the tarsus in the human skeleton? In the frog?
19. What is the ratio of the length of the metacarpus to the length of the metatarsus in the human skeleton? In the frog?
20. What is the ratio of the vertical diameter of the skull to the dorso-ventral diameter in the human skeleton? In the frog?
21. What is the ratio of the vertical diameter of the skull in the human skeleton to the transverse diameter? In the frog?
22. What is the ratio of the dorso-ventral diameter of the skull in the human skeleton to the length of the head and trunk? In the frog?
23. What is the ratio of the length of the spinal column to the length of the head and trunk in the human skeleton? In the frog?
24. What is the ratio of the length of the sacrum to the length of the spinal column in the human skeleton? In the frog?
25. What is the ratio of the length of the arm to the spinal column in the human skeleton? In the frog?
26. What is the ratio of the length of the leg to the length of the spinal column in the human skeleton? In the frog?
27. What is the ratio of the dorso-ventral diameter of the chest to the transverse diameter in the human skeleton?

Square Root.

By JOHN R. DENNIS.

It ought to be explained before the term "square root" is used that division is a process of finding the other factor when the product and one factor are given; and this by examples, not words. This will demand several lessons.

Next show that it is possible when the product of two equal factors is given for the factors themselves to be found.

First, the teacher says, let us find the product of 2 by 2, 3 by 3, and so on; I put the numbers down in a line and will put the products under; you may give me the products; he writes:

1 2 3 4 5 6 7 8 9; they give:
1 4 9 16 25 36 49 64 81.

These products, he says, are called "squares" or square numbers. Make a statement about square numbers.

"A square number is one that has two equal factors." Right. Now I will put down the numbers 10, 20, &c., and you may give me the squares of them; he writes:

10 20 30 40 50 60 70 80 90; they give:
100 400 900 1600 2500 3600 4900 6400 8100.

Now look at the first row of squares and then at the second and make a statement. (This may require some time; but they must make it.)

(*A*) "When the number is one figure the square will have one or two figures" "When the number has two figures the square will have three or four figures."

That is very good. Now let us apply these statements. Here are some supposed square numbers, tell me how many figures in the equal factor.

97 ("One"), 70 ("One"), 1500 ("Two"), 150 ("Two"), &c. Very good. Then I can tell in any supposed square how many figures in the equal factor.

By the way, the equal factor is called a *root*; you have two new terms *root* and *square*. $12 \times 12 = 144$, which is *root*? Which *square*? He gives many examples.

Now I will write 25 supposed squares and you may write the number of figures in the root.

2400 ("Two"). Why? "Because we saw in the row of squares that two figures in the root gave four figures in the number; so four figures in the number will give two in the root." 1800 ("Two"). Why? &c.

Some put a little line like this between every two figures 17/00; 14/00; will that show how many figures there are in the root? There is one figure in the root for every two figures in the number.

Let us square 12, 13, and 14 this way:

12	13	14
12	13	14
4	9	16
40	60	80
100	100	100
144	169	196

Let us see how we squared 12; for if you know how you tied a knot you can untie it.

I squared the 2 units; then I multiplied the ten by the units; this is 20; then the units by the tens, 20 more; both make 40; then I squared the ten. Is that right?

(*B*) The operation appears in *three* parts; *the square of the tens, twice the tens by the units, and the square of the units.* (He shows that it is the same with 13×13 and 14×14).

TAKING THE SQUARE ROOT.

Having seen how the square is made, I can go back to the root. If I can take the square root of 144 I can take it of other numbers, let me try that first. Remember that there are two figures in the root; one figure in 100 and one in 44 (see *A*). Remember 144 is 100+44.

1 | 44(10+2	1 | 69(10+3	1 | 96(1+04
1 00	1 00	1 00
20) 44(2	20) 69(3	20) 96(4
40	60	80
4	9	16
44	69	96

(1) The square root of 100 is 10; I put it at the right (it is a part of the equal factor I am in search of); I square that; it is 100, and subtract. Now remember B; the 44 contains twice the tens into the units and the square of the units. So I double the 10 and get 20, and (2) divide and get 2; that is the other part of the root. (3) Now I multiply the 20 by 2, it equals 40, then I add the square of the 2—together they make up 44 and there is nothing left. So I find the two equal factors in 169 and in 196. There are three steps in taking the roots, for there were three steps in squaring them.

Now take 218, 318, 418. We apply the two rules *A* and *B*. What is the root in 2; it is 1—it must be 10; square this, 100, and subtract; 118 is left; double the root and divide and you get 4; there is 22 over; never mind that now.

2 | 18(10+4	3 | 18(10+7	4 | 18(20+0
1 00	1 00	4 00
20)118	20)218	20)18
80	140	
16	49	
22	29	

The same plan pursued with 318 gives 17 for the root and 29 over. The same plan with 418 gives 20 for the root and 18 over.

Now let me square 22 and another may take the root of 484. Apply *A* and *B*.

4 | 84(20+2	22
4 00	22
40)84	4
80	80
4	400
	484

You see that you get the same numbers in squaring that you do in unsquaring, only reversed.

If the teacher feels his class is able he will do well to teach some use of *letters*; thus:

Let us multiply by letters; we can do it as well as by figures.

$a+b$	$b+c$	$x+y$
$a+b$	$b+c$	$x+y$
$ab+b^2$	$bc+c^2$	$xy+y^2$
a^2+ab	b^2+bc	x^2+xy
$a^2+2ab+b^2$	$b^2+2bc+c^2$	$x^2+2xy+y^2$

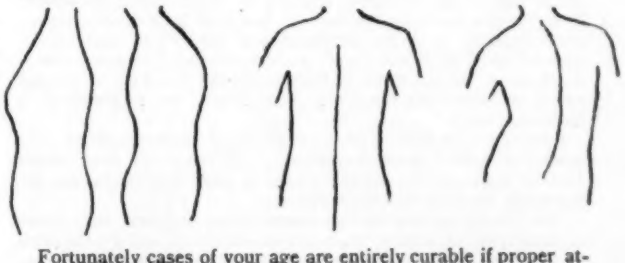
Physical Education. VII.

By E. B. SCARBOROUGH.

BACK AND SPINE.

NOTE.—The teacher should have drawn on the board illustrations similar to the following before the talk begins.

To the Pupils:—No. 1 is an illustration of the normal or correct back. You will see that it has four curves—two with the convexity toward the front, and two toward the back. The second illustrates the curve at the shoulders as increased. We call it round shoulders, or if marked kyphosis. Fig. 3, shows a back view of a normal back. The line of the spine here appears perfectly straight. In the next illustration we see it curved to one side showing a state of the spine called scoliosis. Figs. 2 and 4 represent two of the most common forms of defective spines. They are to be found among people we see right around us every day much more frequently than many people think. It would be strange if, among so many as there are here in this room, there were not samples of both kinds, although we may not have noticed it.



Fortunately cases of your age are entirely curable if proper attention is given to the matter.

Now let us see why misshapen backs are so common and learn what we can do to cure or prevent such conditions in ourselves.

(If the school is not supplied with a human skeleton, the teacher can easily secure some vertebræ from the dinner-table. A few disks from a fish's backbone are better than nothing.)

Our backbone is made up of twenty-six small bones, one resting on top of the other. We will set these vertebræ up on my desk to represent the backbone. Do you think I could push them out of a straight line very easily? Tell me what you think keeps our vertebræ in a straight line. Yes, the muscles and ligaments of the back are what hold them in place. You see these prongs,

or processes, as they are called, branching out from the vertebra. It is to these the muscles and ligaments are attached.

Now let us stand our bones up again and imagine there are muscles joined on all sides of the bones. Suppose I pull the muscles on this side just a little bit more than I pull those on the other side, what will happen to the bones? Yes, to be sure, we shall find our column bending out on that side where I pulled.

It is just this way that our spines become crooked. Some muscles that are used more and are stronger than others pull harder than their mates on the opposite side, and the bones curve out on the side of the hardest pull.

Sitting and standing posture too has a great deal to do with the position of the spinal column. You can easily see that the spine would be greatly affected by the postures we have discussed so often in former lessons.

Of course the beauty of a form is disfigured by such a defect of the back, but this is not the worst result.

The vital organs lying in front of the backbone are displaced proportionately, sometimes bringing about diseased conditions and always weakening them.

We have said nothing about the round hole which we see just back of the body of the vertebra; but I think some of you can tell me what passes through it. Yes, and do you think the delicate, sensitive spinal cord would be affected at all by any unnatural curves of the spine? It certainly is, as are the nerves which branch out from it between the bones. So a bad nervous condition of the body is another serious consequence of spinal curvature.

How can we avoid getting all these evil results? I should say by making a great effort to keep in the proper posture of body now while we are growing and the bones are soft, and by taking such exercise as shall make the muscles strong and *evenly* developed.

Let me try to show you why it is that back muscles are so universally weak. Suppose you had a rubber tube through which water could run. Now stretch your tube as long as you can. Tell me, would the hole for the water be larger round or smaller when the tube was stretched?

Our backs are covered with muscles and these muscles are everywhere filled with tiny little blood-vessels, or capillaries, so thick that not a pin point could be put down without touching one of them. It is from these capillaries that the muscles get their food to grow by and through them that they send off the poisonous wastes. Now if a person keeps his back muscles stretched all the time, as he does when he keeps his back in a stooping position, he stretches all these little blood-vessels in just the way you stretched your rubber tubing and the blood stream which flows through is made smaller. So we can understand how stretched muscles are poorly nourished and therefore weak.

We stretch our back muscles every day much more than we need to. In going up stairs or up a hill the back should be kept erect. If we need to stoop to pick up something from the floor, bend at the knees and let the stronger leg muscles do the work.

It does not follow from this conclusion that the back muscles are never to be stretched. An alternate stretching and contracting movement acts as a pump to suck the blood along and thus the circulation is aided and the muscle is made all the stronger for the exercise. It is the *habitual* stretched condition that is to be avoided.

Any form of dress which hinders the full development of the waist and back muscles invites spinal curvature.

High heels are another fruitful source of this evil.

To the Teacher:—Exercises, 1. Hands on hips, bend trunk forward, keeping small of back hollowed in and eyes on the ceiling. In this exercise, see to it that the pupils never round out their backs like a cat. 2. Same position of hands, bend backward, being careful not to go too far. 3. Hands at back of neck, repeat Nos. 1 and 2. 4. Arms over head and parallel to each other, forward bend as in No. 1, and at the command, "forward, downward, bend" let the trunk be fully bent until the tips of fingers nearly or quite touch the floor. This should be followed by a backward bend.

Carrying light articles on the head may be recommended. The women of some European countries, who carry on their heads hods of brick and mortar to the tops of high buildings, are remarkable for their beauty of figure.

The children should be encouraged to try at home such exercises as lying on a table, head and shoulders off, and use the arms as in swimming, while the feet are held down by another person.

Another:—Lie down on face and raise the head while some one resists the movement.

All hanging exercises are good for the spine.

What a help and blessing THE SCHOOL JOURNAL is! It is both a help and a torment to me. A help in *many* ways,—a torment because I find from it, how unfitted I am without study for the work I try to do. It takes, or ought to, the wisest heads to teach the youngest minds—I would rather have a child of twelve than one of five to train, provided it had been trained aright. F. M.

Physical Training.

(Program of Exercises given in the Brooklyn Schools.)

[Lesson I. was given in THE PRIMARY SCHOOL JOURNAL for December.]

LESSON II.

POSITION—HANDS ON HIPS.

1. Arm extension upward right—Begin! 1, 2. 8-8-8-8.
NOTE:—*Palms in.*
2. Step position backward right—Begin! 1, 2. 8-8-8.
3. Step position backward right, both arms upward—Begin! 1, 2. 8-8-8.
4. Arms circle over head, trunk forward bend—Begin! 1, 2, 3, 4. *Forward twice, face right twice, left twice, alternate twice.*
NOTE.—*To combine with the facing, turn to side, arms in circle, 1—bend forward, 2—up, 3—face to the front, hands on hips, 4.*
5. Trunk side bend right—Begin! 1, 2. *Alternate twice each side.*
6. Breathing—Arms folded behind, inhale through nostrils, exhale through mouth.
7. Marching. Facings.
To the right—face!
To the left—face!
Fancy step—Cross, tap, step.

LESSON III.

POSITION—HANDS ON HIPS.

1. Slide step forward right—Begin! 1, 2. 8-8-8.
NOTE:—*Slide free foot forward until strong knee is bent, free one straight.*
2. Slide step side right—Begin! 1, 2. 8-8-8.
3. Slide step forward right, both arms forward—Begin! 1, 2. 8-8-8.
4. Slide step side right, both arms side—Begin! 1, 2. 8-8-8.
5. Arms circle over head, trunk forward bend—Begin! 1, 2, 3, 4. *Forward twice, face right twice, left twice, alternate twice.*
6. Trunk side bend right, step position left—Begin! 1, 2. *Alternate twice each side.*
7. Breathing—same as in previous lessons, but rise on toes while inhaling.
8. Marching. Facings.
Fancy step—Clap with the tap, tap, step.

LESSON IV.

POSITION—HANDS ON HIPS.

1. Arm extension upward right—Begin! 1, 1. 8-8-8-8.
2. Slide step backward right—Begin! 1, 2. 8-8-8.
NOTE:—*Forward knee bend, rear one straight.*
3. Slide step backward right, both arms upward—Begin! 1, 2. 8-8-8.
4. Arms circle over head, trunk forward bend—Begin! 1, 2, 3, 4. *Forward twice, face right twice, left twice, alternate twice, circle right, circle left.*
NOTE:—*To circle right—face right, arms in circle, over head, 1—bend, 2—up, 3—face to the rear, hands on hips, 4—face right, arms circle, 5—bend, 6—up, 7—face to the front, hands on hips, 8. Reverse for "Circle left."*
5. Trunk side bend right, step position right—Begin! 1, 2. *Alternate twice each side.*
6. Breathing—same as in Lesson III.
7. Marching. Facings.
Fancy step—March on toes, arms folded behind.

TEACHER'S SYNOPSIS.

Give pupils a quick drill on right and left hand, foot, etc., before the first lesson.

Have them stretch both arms up and out to assist the body to a better standing position before each lesson.

Intersperse through the lesson at discretion the command, "In place—rest!"

The breathing exercises may be used at any time through the lesson when respiration seems quickened.

ARM EXERCISES.

1. Arm extension forward—right 8, left 8, alternate 8, both 8.
2. Arm extension side—8-8-8-8.
3. Arm extension upward—8-8-8-8.

FOOT EXERCISES.

1. Step position forward—right 8, left 8, alternate 8.
2. Step position side—8-8-8.
3. Step position backward—8-8-8.
4. Slide step forward—8-8-8.
5. Slide step side—8-8-8.
6. Slide step backward—8-8-8.

COMBINATION FOOT AND ARM EXERCISE.

1. Step position forward, both arms forward—8-8-8.

2. Step position side, both arms side—8-8-8.
3. Step position backward, both arms upward—8-8-8.
4. Slide step forward, both arms forward—8-8-8.
5. Slide step side, both arms side—8-8-8.
6. Slide step backward, both arms upward—8-8-8.

TRUNK EXERCISES.

a 1. Arms circle over head, trunk forward bend—1, 2, 3, 4.
2. Same with facing twice to the right, twice left, and twice alternating.
3. Same, add circle right, circle left.
b 1. Side bending.
2. Side bending combined with step position with opposite foot.
3. Side bending combined with step position on same side.

BREATHING EXERCISES.

1. Arms folded behind, inhale through nostrils, exhale through mouth.
2. Same rising on toes while inhaling.

MARCHING AND FACINGS.

Mark time—mark!
Ready—halt!
Forward—march!
To the right—face!
To the left—face!

FANCY STEPS.

1. Tap, tap, step—arms folded behind.
2. Cross, tap, step " " "
3. Same with clapping.
4. March on toes—arms folded behind.

Lessons on the Clam.

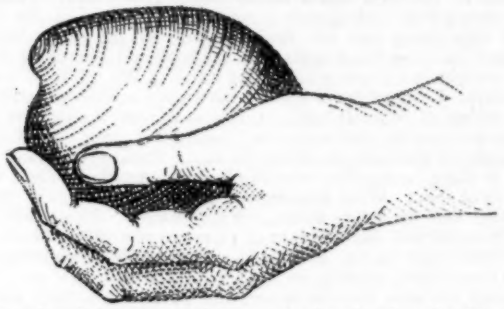
(REPORTED.)

Preparation.—Small clams if not too small, are better than large; and dirty clams are better than clean, showing the epidermis more satisfactorily. Have one for each pupil; knives to open shells.

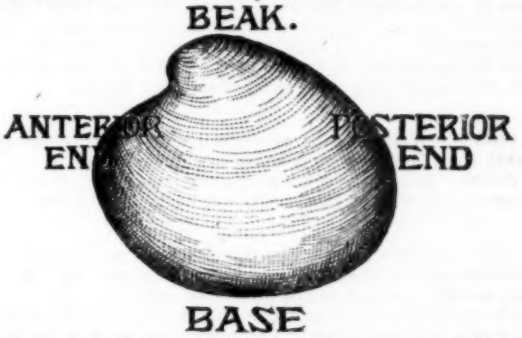
The lessons on the shell can be given with empty clam-shells, which may be had at any fish market for the asking. When the whole clams are used, they should be boiled. Common humanity would suggest that they be not dissected alive, unless by experienced pupils who will not mangle them, but who wish to study circulation of blood, the action of the heart, etc. Do not be discouraged if pupils do not find all the parts at the first dissection.

Lesson.—Is the shell as wide as it is long? Which way is it longer? Describe the shape. (One edge is one long curve. The other has two curves coming together at a point.) We call that point the beak, and the long curve at the other side is called the base. What can you see back of the beak? (A long, dark body.) That is the hinge or ligament. See what you can scrape from the outside of the shell, especially near the base. (Epidermis or outer skin.) Find that the epidermis extends over the edge of the shell. What else do you notice on the outside of the shell? (Lines, parallel to base.) These are lines of growth. Every time the clam finds that he is outgrowing his shell, he makes a new layer of shell, inside, that comes out a little way beyond the old shell, and so he makes his shell grow as fast as his body. Where are these lines the longest? Where are they shortest? Find the shortest one of all and tell me how large the baby clam was. Which is the oldest part of the shell? Hold the clam in the palm of your left hand, with the base down and the beak pointing toward me. Look at both sides. Are they the same shape? The sides of an oyster are not. How many parts has the clam's shell? They open and shut like two doors, so we call them valves. What is a bicycle? A tricycle? A triangle? A tripod? (Illustrate with drawing, to impress meaning of prefix.) A biped? Because the clam has two valves we call him a bivalve. The beak is nearest which end? We call that the front end, because when he moves around that end goes first. Which end is farthest from the beak? What shall we call that? (The back end.) (Anterior and posterior.) Sometimes the beak is almost in the middle, but it always *points* to the front end. Lay the clam on its side in the palm of your left hand with the beak toward your thumb. If the beak does not point toward you make it do so. Now the clam is lying on its right side. You are going to separate the left shell. Slip your knife through, *close* to the shell inside gently loosening the skin that lines it and cutting the (adductor) muscles (one at each end) which held it down. That thin skin is called the mantle. Open the shell. Look at the mantle. Where is it thickest? How is it trimmed at the edge? (Ruffle.) The work of the mantle is to make the shell.

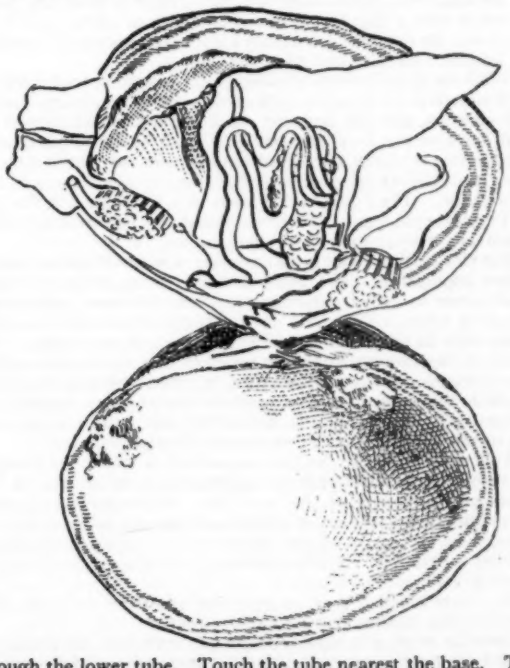
Find the two scars on the inside of the shell where you cut away the adductor muscles. What shape are they? The adductor muscles are very strong. When the clam wants his shell closed, he has to hold it together with these muscles, every minute of the time; for when he stops pulling, the hinge (ligament) at the back opens the shell. When the clam is resting, how do you think the clam has his shell? (Open.) And how would you expect to find a dead clam? (With the shell open.)



If a clam is left high and dry on the beach when the tide goes out, he usually holds his shell tightly closed as a protection against birds or other animals who would like to eat him, and waits patiently for the water to cover him again, and bring him food. Think of the poor clams in the market, waiting for the tide to come in! How tired they must become!



Look on the inside of the shell for other marks besides the muscle scars. (Mantle line, from scar to scar, showing where edge of mantle was attached.) Do you see any lines of growth on the inside? No, the clam makes a whole new inside to his shell every time he enlarges it. Where is the shell thickest? Why? Look for the clam's teeth. (A row along base that fit like cogs to the opposite row when the shell closes. At hinge, two upon left shell and one upon right.) The clam has no teeth to eat with. Near the posterior, (back) end of the body find something black. See if it is double. Slip the head of a pin under the white mantle lobe back of these two black tubes and out



through the lower tube. Touch the tube nearest the base. The clam takes in water through that tube and sends it out through the other, after it has passed over his gills, giving oxygen to his

blood, and across his mouth, carrying food there. (When you are older and have learned to look very sharply, we will study the clam again and find his heart, and his mouth. You could not see them now.)

Toward you from the back tubes (siphons) and down in the hollow of the shell, find a white, tough, gristly body. That is the clam's foot. He thrusts it out of the front end of the shell and digs down into the sand with it. At the same time he thrusts out those black tubes from the back end, stretching them six or eight inches above him to get water. We call those tubes siphons. Lift the lobe or half of the mantle nearest you with all the fingers of your left hand. Cut it away from the siphons and adductor muscles, and turn it up toward the peak. Notice the fat body of the clam just above the foot. Look sharply and tell me if there is anything over this body. (Another mantle, two pieces of skin.) What markings do you notice on them? Many parallel lines extending across, not lengthwise. Those lines are really tubes, and the two rows of them are two gills. There are two more gills on the other side. The colorless blood passes into those tubes, sending its impure air (carbonic acid gas) out through the skin into the water, and pure air (oxygen) passes from the water through to the blood and purifies it. (If the children are inexperienced observers, these more difficult observations may be omitted.)

I once kept a live clam in water and watched him till he put out his siphons. Then I took a medicine dropper and dropped red ink into the water. When it went near the tube nearest the base it was drawn in, but when it sank near the other tube, it was blown away. When the clam would take no more, I killed and opened it. Then I could see very clearly every part of the clam through which the ink had flowed, for those parts were still full, and the red color marked them out nicely for me.

SHELL.

Outside.—Shape, number of parts (valves), peak, hinge (ligament), base, lines of growth, outer skin (epidermis).

Inside.—Beak, base, scars where muscles were fastened, scar where mantle was fastened, teeth near beak, teeth at base.

BODY.

(Soft, unjointed). Mantle, its position, attachment, use; adductor muscles, their number, position, strength, use; siphons, their number, position, use of each; foot, gills.

(Having studied the clam thoroughly, it is well to use an oyster for review and comparison. The oyster has no foot, as he remains attached to some object and needs none. There are no teeth on the base of the shell, no siphons, and he has but one adductor muscle; but the mantle, gills, fat body, beak, etc., will readily be recognized.)

Geography by Doing. VI.

By WALTER J. KENYON.

TWENTY-FIRST LESSON.

Animals and Productions.—It avails little to load the pupil's memory with a long list of *names of products* having no interest for him. He commits to memory for to-day's lesson. To-morrow he forgets. Recall your own school days.

We have already made a collection of common food products, and materials for raiment, such as rice, coffee, tea, spices, cereals; silk cocoons, raw silk, flax, etc. A home-made collection of this sort is within reach of any school. Such of these materials as are notable products of the various regions of South America may be described or read about, with respect to processes of their production. Their geographic areas may be located on the map.

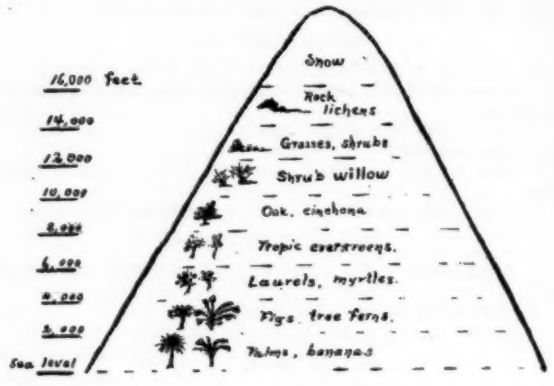
The principal animals of the continent may be conversed about. Their pictures are found in all geographies.

But this sort of detail is, in the main, a wayside matter, and of minor importance. The more desirable thing is that the pupil shall come to broad generalization with reference to flora and fauna by zones. The study of climate has shown him that these zones exist in altitudinal as well as latitudinal succession. The study of vegetation should now reveal to him like species seeking like climates. So South America becomes a key to the entire world in this regard. As he acquires this tendency in study, the hitherto meaningless details will quietly slip into their places in his memory, as fast as they are worthy of place.

Following this plan, the first proposition is that in hot climates (with moisture considered) the vegetation is luxuriant. A few types, such as the palms, the canes, etc., may be noted in passing. Note also that where tropic plants have cousins in the temperate zone, the tropic varieties are larger as well as more numerous. All the geographies contain pictures which will verify the pupil's conclusions in this direction.

In Guyot's and others' geographies are given colored plates showing this vertical distribution of flora.

Only the tropical areas at or near sea level have the characteristic flora of the tropics. Even in the neighborhood of the equator the palms seek only the lowest and hottest regions. Above the altitude of 4,000 feet the vegetation becomes sub-tropical. Thus an altitude of 4,000 feet accomplishes in this instance a climatic change of, roughly speaking, 2,000 miles of latitude. In the equatorial Andes the vertical succession is shown by the illustration.



Topical questions:

Why does climate grow colder as we draw further from the equator?

Why does vertical climate grow colder as we climb away from the general land surface?

Find what trees grow in Ecuador at an altitude of 8,000 feet. About what latitudes do the same family flourish in North America?

Call attention to the fact that the great wooded regions of South America are areas of abundant rain. Consult rain map and find if other great rain areas are wooded. Discover also if the reverse is true.

TWENTY-SECOND LESSON.

Notable Products.—Where do we get "Rio" coffee? (Tell or read something of the coffee industry.)

Gutta Percha and rubber? (Tell about the rubber tree.)

Cinchona (quinine). Its production, Use and abuse.

Cocoa, chocolate? (Correct form, *cacao.*)

Products, continued. Animals.—The Llama of the Andes? The Condor?

The herds of the pampas and llanos?

The diamond fields of Brazil?

The silver and copper of the Andes? The Incas wealth. Read or tell about.

TWENTY-THIRD LESSON.

Man.—So called "political geography" is history, pure and simple. The national boundary lines which we so faithfully commit to memory to-day, are twisted beyond recognition by the political ructions of to-morrow. A detailed memorizing of state boundaries is therefore not to be numbered among "the more excellent things," even of political geography.

Draw on board, and have pupils draw an outline map of South America. Fill it in with the political boundaries as they exist to-day. Call children's attention to the fact that they have changed much in recent years. Prevent them from acquiring the concept of *a flat yellow country with a red line around it.*

Point to a certain spot on a certain boundary, and question as to the structure just there, the scenery, the climate.

Get the children's idea of how state boundaries are actually laid off. What would they see in passing over the line, from Venezuela to Colombia?

Chief Cities—Children locate and infer, as far as possible, structural position, climate, and characteristic pursuits. Teacher add facts concerning population and history.

Bogota, Caracas, Georgetown, Paramaribo, Cayenne, Rio Janeiro, Montevideo, Buenos Ayres, Santiago, Sucre, Lima, Quito.

TWENTY-FOURTH LESSON.

History.—Narrate a brief history of the South American peoples. The present civilized peoples are of what blood? In Peru? In Brazil? Chile? Why do we say French, Dutch, and English Guiana?

The Indians of the great rivers?

The Indians of Peru?

The dwarfs of Patagonia and Fuego?

The ancient peoples—the Incas?

Conquest of the Incas? Pizarro, something about him.

The incessant strife of the South American states. Is South America ripe enough for republican government?

"The course you are pursuing *must* result in rousing teachers to read, study, and think more of the great work in which they are engaged."

MARY E. SHAW.

Ft. Edward, N. Y.

Nature Studies.—One Month's Work.

ANIMALS.

There must be an employment of things near at hand. Suggestions here made will demand considerable time, probably require over a year. The pupil must *observe*, and put down what he sees. Each of the class should own a bank book, and copy in it his observations; they will be written on cheap paper with pencil, in the first instance. The object must not be to obtain a quantity of writing, but a quantity of *seeing*. Let a case, no matter how plain, be put in the corner of the school-room, and materials as nests, shells, cocoons, etc., be collected. The teacher will procure a few books on natural history as a starter for a library. The required re-writing of notes may be done during penmanship hour. The pupil should do his observing independently, out of school, and bring in his penciled notes.

Example.—Horse,—sorrel, white, face, three feet and part of mane and tail; white, standing, hitched, patient, no check rein; head, length of barrel; body, length of four barrels—about 6 feet; height of shoulders, about 5½ feet; gentle eyes, listening ears, changes feet, twitches skin, turns head to look at other horses, knows his master's step, starts without command.

Re-written.—I saw a doctor's horse, this morning, standing in front of a gate. He was hitched to an iron post. A barrel stood near and I took the opportunity of looking to see whether it is really true that a horse's head is as long as a barrel. It is true. His body was about four barrels in length, and his neck one. From forehead to tail I should think he was about nine feet in length. At the shoulders he was about 5½ feet high. Come to think of it, these estimates do not agree very well. I shall have to take the first opportunity of *measuring* both a flour barrel and a horse.

This horse was sorrel, except his face, three feet, and a part of his mane and tail, which were white.

He stood patiently, turning his ears, from time to time, toward sounds that attracted his attention. I was glad to see that he wore no check reins. He often changed the position of his feet, to obtain rest. He kept twitching his skin and switching his tail to dislodge the flies. Luckily, his master had left him the whole length of his natural tail for that purpose.

His eyes were gentle and beautiful. He turned them upon other horses as they passed, as if in some sort of sympathy. Perhaps he felt his loneliness, separated (as most work horses are) from companions of his own kind. Perhaps he looked to see if he recognized them, or if they were as well cared for as himself.

He knew his master's step as it came across the sidewalk, and prepared to start on. As soon as he heard the springs go down with the doctor's weight, he moved off without waiting for a word of command.

Criticism.—Keep down to the bare facts as much as possible in reporting these observations. There is not too much speculation in this report, but the ten dency here shown will produce too much of it in future reports, unless resisted. The true scientist waits until he has a great many facts before he begins to interpret them. The report is well arranged in that it describes the horse first as to *appearance* and then as to *action*. It is also well condensed. Observe the horse further as to points *a*, *c*, *d*, *e*, and *g*.

DIRECTIONS FOR PUPIL.

1. Observe carefuly some quadruped (as a horse) and make notes and write out what you see.

a, Note the covering; *b*, what it was doing; *c*, its use; *d*, its voice; *e*, its habits; *f*, its size; *g*, its food and other facts.

2, 3, 4. Observe others in the same way.

5–8. Observe a wild quadruped as a rat, deer, etc.) and tell how it prefers to live in addition to *a*, *b*, *c*, etc.

9–12. Observe a wild quadruped usually seen in cages (as a tiger) still when it is native, as well as give the points *a*, *b*, *c*, etc.

(Take your notes roughly and afterward put them into good shape for filing.)

13. Observe a domestic fowl (as a hen) and make notes and write out what you saw: *a*, its covering; *b*, its habits; *c*, its use: *d*, other points, as voice, color, etc.

17–20. Observe birds and write. Observe as to voice, time of flying south, nests, etc.

"I slept, and dreamed that life was beauty;
I woke, and found that life was duty.
Was my dream, then, a shadowy lie?
Toil on, sad heart, courageously,
And thou shalt find thy dream shall be
A noonday light and truth to thee."

You are giving us fine work, especially in the primary contributions. C. H. GLEASON.

Supplementary.

The First Robin.

By LIZZIE BURT.

"Oh! I saw a robin dear
In a tree;
And he sang a little song
All for me!
Oh! he sang a little song!
But he did not sing it long;
For the wind was blowing strong
As could be;

"When I said my little prayer
By the bed,
I remembered what Mama
Once had said,
How God listens to each word,
So I told him of the bird;
And I'm very sure he heard
What I said;

"And it blew him far away
Out of sight,
And the snow was falling down
Thick and white.
Oh! it blew him far away!
And I did not care to play
Any more at all that day;
But at night

"For the snow it did not stay
And at dawn
Little robin hopped about
On the lawn;
And he sang a jubilee
In the crooked apple-tree;
For the winter, don't you see?
It was gone."

Arbor Day.

By LIZZIE M. HADLEY.

Air: "When Johnny Comes Marching Home."

The blustering North Wind now must go,
Hurrah! Hurrah!
With chilly old Winter's ice and snow,
Hurrah! Hurrah!
For softly blows the warm South breeze
And greener grow the budding trees,
And the year is glad
When shivering Winter's gone.

Mother Nature.—Good morning, Father Winter, I am glad to meet you though you give me but a chilly welcome. What is the trouble?

Winter.—Trouble enough, I should think! The South Wind is coming this way and I am sure he means to call upon me.

Mother Nature.—Don't let that trouble you. The South Wind's a fine fellow, I'm sure.

Winter.—Fine fellow, indeed! He's a *thief*, and comes prowling around after my ice and snow. My family have never associated with him and I never intend to. Whew! how warm it is growing. I must pack my trunks and start for the North. I suppose every one will be glad to be rid of me, for they're always trying to hurry me off. Hark! I really believe I can hear a bluebird.

SONG—(*Outside*) *Tune:* "Winter, Adieu."

April is here.
Dawn of the year.
Robing in green the hills,
Waking from sleep the rills.
April draws near,
Spring of the year.

Nature.—You are right, Father Winter, the birds have come and the South Wind must be near.

SONG.—Winter, Farewell.
Oh, fare ye well,
Now it is time to go.
Off with your ice and snow.
Winter, farewell,
A long farewell.

Winter.—I suppose I must go. I hoped to stay awhile longer, but I can't stand those saucy birds. If it were not for that meddling South Wind I would soon teach them a lesson. But I feel that he is coming nearer and nearer. I must go while I can. Farewell, Mother Nature.

Nature.—Good-bye, my child. I hope your temper will improve before you come again. (*Exit Winter.*)

Birds (*peeping in*)—Has he gone?

Nature.—Yes, come in, Bluebird, come in, Robin and Swallow. Welcome home. I am glad to see you.

Birds.—We are glad to be here. It seems good to be at home again.

Bluebird.—I really began to fear crusty old Winter never meant to let us in.

Nature.—I am sure he was sorry to hear you singing outside, and would gladly have sent you off again. But now that you are here it is time you set to work. There are old nests to be mended and new ones to be built, besides all the new songs to be practiced.

Birds.—Yes, we birds are sure to have a busy time of it.

Nature.—So will all my children until the spring work is done. I, too, must do my part. I am hard at work now getting ready for Arbor day.

Robin.— I really can't remember

But I've heard my grand'am say
That when she was a little bird
There was no Arbor day.

Nature.—She was right, dear Robin. But so much wood was used and our forests were disappearing so fast that people thought something should be done to preserve them, and in 1872 the people of Nebraska set aside a day for planting trees. That was the *first* Arbor day, and since then state after state has fallen into line, until now the long procession extends from the Atlantic to the Pacific shore.

Birds.— Hast heard what words of wisdom
Have been said about the trees?
Listen, and we will tell you,
A few of them, are these.

Bluebird.—"Heaven and earth helps him who plants a tree,
And his work its own reward shall be."
—*Lucy Larcom.*

Swallow.—"Set this little seed
And trust its tender boughs to time
To grow to touch the stars sublime
As grows and grows some small, good deed."
—*Joaquin Miller.*

Robin.— "To all that sow
The time of harvest shall be given.
The flower shall bloom, the fruit shall grow
If not on earth, at last in heaven."
—*Whittier.*

All the Birds.—"Once well planted, a tree will grow when you are sleeping and it is the only thing that needs no tending."—*Scott.*

Mother Nature.—Those are pleasant words, and I like them well; but look, here come the trees. (*Enter several children representing trees.*) Welcome, my dears, you are out early.

Trees.— 'Tis the spring o' the year,
And we've all come this way
To help you, dear mother,
Keep your Arbor day.
On our branches, full many
A bird-song is chanted.
And each tree would tell you
Why it should be planted.

Mother Nature.—It is well. Let each one give his reasons. What name do you bear?

Elm.—I am called the elm.

Mother Nature.—Whence come you, O Elm?

Elm.— I stand in the sunny meadows,
I guard the uplands green.
And high 'mong my shading branches
The oriole's nest is seen.

Mother Nature.—Of what use are you?

Oak.— The troughs where oft in summer's heat,
The beasts their thirst may slake,
And many a whirring water wheel
Of my tough wood they make.
The keel of many a stately ship
That sails upon the seas,
Whate'er to water's most exposed
Is oft made from my trees.

Nature.—You must indeed be a useful tree. Pray tell me who are these who come with you?

Several Trees.—We are old historic trees.
We have come this way
To beg you that the elm
May ever grace your Arbor day.

1st.—I am "Penn's Treaty Tree." I once stood in Philadelphia and beneath my branches Penn made his treaty with the Indians. I was blown down in 1810, and from my rings was found to be two hundred and eighty-three years old.

2nd.—I am Boston's Tree of Liberty. I once stood at the corner of Washington and Essex streets. From my branches August 14, 1765, hung the effigies of Lord Bute and Andrew Oliver, secretary of the colony. The British soldiers cut me down in 1775.

3rd Elm.—I am the Washington elm and am still standing in Cambridge, Mass. Whitefield preached beneath my branches long years ago, and there, upon the 3d of July, 1775, Washington took command of the American army.

Together.—Will you take us, Mother Nature? Shall the elm be among the trees planted on Arbor day?

Nature.—Yes, fair elms, we will surely plant you.

Elms.—We thank you, dear mother, and may you ever keep in mind this thought,

"Time is never wasted
Listening to the trees."

(*They step aside, and the oak approaches.*)

Oak.— I, who beg a place of thee,
Am the oak of history.
Once this ancient tree of mine
Guarded many a holy shrine.
In my groves were temples found,
With my leaves were heroes crowned.
In the lore of other days,
Dryads, spirits, elves, and fays,
Watch and ward kept over me
And made their homes in oaken tree.

Nature.—Why should we plant you, O Oak?

Oak.—Plant me for use and beauty.

Nature.—What can you do?

Oak.—It would take too long to tell you half the wonderful things I am used for. Men put me in their houses, ships, furniture, carriages, weapons, and fortifications. Gunpowder is made from my burnt branches, and tannic acid for tanners and dyers from my nut galls. Virgil calls me

"Jove's own tree
That holds the world in awful sov'reignty."

My trees have histories, too, and here is one to tell its story.

Charter Oak.—I am the Charter Oak. I was standing in Hartford, Conn., in 1687, when King James sent Sir Edmund Andros to take away the charter of the colony. It was hidden in my hollow trunk, and after searching for a long time Sir Edmund had to go back without it. I was blown down in 1856, and from my trunk was made the chair of the vice-president in the senate chamber at Washington.

Royal Oak.—I am the Royal Oak whose hollow trunk sheltered Charles II. after the battle of Worcester.

Nature.—You are welcome, O Oak. You, too, shall have a place in our Arbor day festival.

Maple.—I am the Maple Tree. Plant me for my bright autumn foliage and the sugar I bring you.

Trees Together.—
The maples in gold and scarlet,
As the autumn days go by.
Look as if summer's rainbows
Had been hung on their boughs to dry.

Birch.—Spring is here. Plant me because in Norse mythology I symbolized the return of spring.

Trees Together.—
"Give me of your bark, O Birch Tree,
Growing by the rushing river,
Tall and stately in the valley!"

Chestnut.—Plant me. I'll shelter you from the rays of the summer sun and in autumn my ripe nuts shall be your food. Chestnuts furnished food for Xenophon's army in their retreat along the borders of the Euxine.

Fir.—I am the Fir; the fire tree of the ancients, the most inflammable of woods. Plant me for your Christmas festivals.

Trees.— Give me of your balm, O Fir Tree,
Of your balsam and your resin.
And the Fir Tree tall and somber
Sobbed through all its robes of darkness,
Answered wailing, answered weeping,
Take my balm, O Hiawatha.

Pine.—I am the tree of Cybele, the mother of the gods, who is said to have transformed a faithless lover into a pine tree; then, as she still mourned for him Jupiter decreed that the pine should always remain green. The victors at the Isthmian games wore crowns of pine, and the pine was one of the trees used by the Jews in erecting their tents at the Feast of Tabernacles.

Trees.— Listen! in the wintry woodlands,
White with ice and rime and snow.
How the winds sweep through their branches
And the pines great organs blow.

Sycamore.—Plant me, the stately sycamore, famous in legend, sond, and story.

Together.— "In the outskirts of the village,
On the river's winding shores
Stand the Occidental plane trees,
Stand the ancient sycamores."

Two Sycamores.—We are the only trees left standing on Rhode Island after its occupation by the British in 1795.

Trees.— Thus from the fields and woods
Upon this Arbor day,
See, line on line, tree after tree,
Come marching down this way.

Nature.—Fair trees, I bid you welcome. Gladly will I plant you upon Arbor day.

Trees.— Take us to your heart, O mother,
Cherish us with tender care.
Let the bright sun shine upon us,
Let the rain, the dew, the air
Do their part to feed and nourish
Every tree for aye and aye.
So shall coming generations
Bless you for your Arbor day.

SONG—*Air:* "Auld Lang Syne."

O, see the merry children come,
How happy they appear
To welcome in the day we sing,
'Tis the gladdest of the year.
On Arbor Day, my dear,
On Arbor day
We'll sing for you our sweetest songs
On Arbor day.

Editorial Notes.

The executive committee of the Brooklyn Teachers' Aid Association reports that the fair given at the Academy of Music netted over $30,000 to the treasury. From donations they received $1,920.05; from daily returns $17,854.55; from tickets, subscription cards, etc., $16,826.88; total, $36,601.48. The disbursements amounting to $6,479.18, the net receipts are $30,122.30. This is a splendid showing of Brooklyn's appreciation of the work of her teachers.

Boston is the intellectual hub of the universe, but they don't know how to spell *psychology* down there!

"Number Work in Nature Study," page 216, is a most suggestive article. Many teachers are studying "Unification" of school subjects. In the matter of language, composition, and reading this is comparatively easy, because every subject in the curriculum has its language and its literature. The greatest problem has been how to correlate arithmetic with other studies. Mr. Jackman is leading in an investigation that is showing the relation of arithmetic to natural science. Other subjects have their number aspect. We shall probably find that every study has its arithmetic as well as its language, and end by absorbing the last and most stubborn of the three R's into a school course which will have the strength of solidarity.

The lesson on "An Orange" given in our issue of the 24th, was from the pen of the author of "Preston Papers."

A system of schools for a great American city cannot be built in a day, and, unless in very exceptional cases, represents the work of a series of able and devoted teachers and superintendents. Washington has been very fortunate in getting, at an early period, as superintendent of schools Mr. Ormond B. Wilson. Mr. Wilson was an excellent representative of the solid, thorough, most reliable school keeping of New England. He brought to the schools a large number of cultivated and experienced teachers and through his great industry, moderation, tact, and persistent aim at improvement commended the public school system to a city in which great numbers of *influential people were prejudiced* against it.

His successor in the superintendency, Mr. W. B. Powell, came to Washington as a rising man from the state of Illinois; and has proved himself one of the most successful representatives of what may be called the northwestern as differentiated from the northeastern type of common school management. Under him the schools have steadily advanced in the lines of sound educational progress and at the present time they are counted among the best in the country.

The thirty-third annual convention of the Ontario Educational Association to be held in Toronto March 27, 28, and 29, ought to draw a large crowd of teachers. The program offers many good things, too many to mention here. Among the speakers we notice Pres. G. Stanley Hall, Inspector James L. Hughes, of Toronto, Prof. S. B. Sinclair, Ottawa, and many others whose names are familiar to the teachers of the states.

Why these flings at Dr. Rice's alleged inexperience in practical school work? Do the papers that indulge in it hope to advance the cause of education thereby? We are informed by a very good authority that Dr. Rice *has taught*, and *successfully* taught in the school of practice connected with the pedagogic seminary at Jena, under the direction of Prof. Rein and the class teachers.

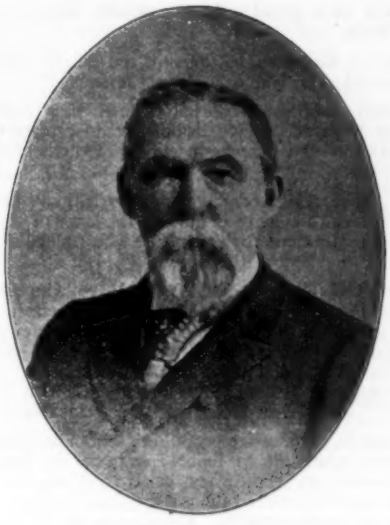
State Supt. Schaeffer, of Pennsylvania, is stirring up the people of the commonwealth to provide suitable and convenient school outhouses. He says that a very large proportion of these houses are "a disgrace to civilization, unspeakably abominable, moral plague-spots in the community." We wish him success in his reformatory work in the interest of health and morality. Let the teachers of Pennsylvania get together to lend a helping by impressing upon the people the need of providing for decent accommodations upon the school grounds for the boys and girls.

Here are a few suggestive remarks of a Vermont manufacturer who was called upon to address an assembly of teachers:

"The searching for doubtful qualities expressed by *x*, *y*, and *z*, however uesful, are not the end and aim of life, and the business world has but little use for them unless the greater problem, how to apply knowledge to the making of self-respecting, self-supporting, and self-reliant citizens, is first solved.

* * * We are prone to lack appreciation of the teacher's usefulness, and teachers are prone to teach without appreciating their individual responsibility. These responsibilities are the greater from the fact that many of our children come from home surroundings which are not conducive to morality, thrift, or intellectual culture.

Future fathers and mothers, and workers in all callings, are under your care, to be impressed by your personality, and shall they blame and curse you for your shortcomings, or rejoice that in early life right influences prevailed; that they were taught to think, to be industrious and frugal; that in all studies at school life's work was not forgotten, and that their teachers did their full duty, being conscious of the responsibility they assumed and alive to the educational demands of the last decade of the nineteenth century?"



Robert G. Metcalf.

Mr. Metcalf is a native of Massachusetts. His father was for many winters a schoolmaster whose small income made it impossible to give his children more of an education than that afforded by the district schools. When only twelve years old he had te go to work in a cotton mill where less than twenty-five cents was given as remuneration for more than twelve hours' of time a day. He often speaks of the days in the cotton mill as a period of valuable training. When asked by a friend what gain he derived from it, he replied: "We learned to work, and we gained, for all time, a real sympathy for the poor and ignorant." Besides the four or five months a year of schooling in the factory village, he was allowed to attend Day's academy in Wrentham for three months and the Bridgewater normal school for a little more than a year.

He began to teach before he was eighteen years old, having charge of country schools for two successive winters. Later he taught for a short time in the Bridgewater normal school and afterwards became principal of the Northboro, Mass., high school. From Northboro he was called to Cohassett, Mass., to take charge of the high school there. In 1853 he was appointed assistant in the Roxbury high school where he remained three years. Finding that only college graduates were elegible to headmasterships of high schools he applied for and received an appointment as submaster in a Boston grammar school. In 1864 he was promoted to a mastership and in 1882 to his present position as supervisor of the city schools.

Mr. Metcalf's department of work as supervisor of the Boston public schools has been the teaching of English. His success is well known to all who have followed the great progress that the Boston schools have made in language work. He has been at all times a friend of the teachers under his supervision, and his untiring efforts to be of service to them are fully appreciated.

George Howland.

By S. A. HARRISON, Prin. of the Burroughs school, Chicago

A "barefoot boy with cheek of tan,"
When o'er New England's fields he ran,
He knew the birds, the trees the hills,
Drank oft and deep at nature's rills;
And so in childhood's early hour
He thus acquired the poet's power.

But when to manhood he had grown,
The city claimed him for its own;
Shut in by walls and stifling streets,
Away from themes the poet meets,
For thirty years, with highest art
He filled full well the teacher's part.

Yet 'mid his tasks his tireless mind,
Oft in poetic fields would find
Rare gems of beauty, flowers of thought,
Which by the Muse's help were wrought
Into the songs he loved so well,
But to the many ne'er would tell.

Deep versed was he in classic lore,
In Homer's themes and Virgil's store,
And much he lived, 'mid deeds sublime,
In that heroic, mystic time
When gods upon the earth did dwell,
And counseled men and him as well.

But most he lived in child's domain;
'Twas here he loved to rule and reign;
To them he gave his highest thought;
For them he lived, he loved, he wrought,
And so he lived and labored on
And died as he had lived, alone.

There will be a grand rally of teachers, March 9 and 10, at Gaylord, Mich.

In Eisenach, Germany, teachers of the public schools are to pay a tax for their income from private lessons.

Prof. Orestes M. Brand, of Paterson, N. J., is making a tour of Scotland, England, France, Holland, and Germany to acquaint himself with the schools and educational methods of those countries.

The Tuskegee, Ala., normal and industrial institute expects to cultivate this year 600 acres of land by the labor of the students. A student recently came to the institute who walked a distance of 123 miles.

The venerable educator, Rev. A. D. Mayo, who for the past fifteen years has been engaged in a ministry of education in the South, by invitation of the school authorities of Newport, Bellevue, Dayton, and Ludlow, Ky., delivered addresses on the following subjects: "Some Things People Expect of the Teachers," "Young America at School," "The Three Schools," "What is Education?" and "How Does Universal Education Pay?"

Detroit will have three fire-proof high school buildings. Many other improvements are to follow; $75,000 are set aside for teachers' salaries, $33,000 for text-books and supplies, and one million and several hundred thousand dollars for real estate, new buildings, and improvements. The amount to be spent in the coming year is expected to be close on to a million and a half of dollars. This is a good showing for a city like Detroit.

J. W. Kitchings, of Whigham, Ga., writes that the empire state of the South has taken a long step forward in the way of paying her teachers their salaries. In the past the salaries have been paid once every twelve or fifteen months, but now the plan is inaugurated to pay the teachers once every three months. Georgia is coming to the front; efforts are being made to employ better teachers for longer terms; a thorough system of supervision is being established, and almost every county in the state has decided to hold a county teachers' institute.

The Hamburg *Hansa*, the leading German nautical journal, pays a high compliment to this country in an article headed "On the Lookout," which is reprinted in the New York *Herald* of the 23d of this month. It says: "The government of the United States still retains the lead in the matter of establishing institutions for the benefit and welfare of navigation." Referring to the celebrated Maritime Congress of all nations held at Brussels in 1853, which was proposed and led by the late commander M. F. Maury, and through which "he gave the first incentive toward getting the seamen of the merchant marine to make meteorological and hydrographic observations," *Hansa* adds that "since that time the tradition has been preserved among the Americans that their country must always be at the head of any movement having for its object the opening up of new sources of scientific aid to navigation and the introduction of methods serving to smooth the way of international traffic and to render the seaman's difficult and dangerous avocation more easy to him." Commander M. F. Maury is well remembered by teachers as the author of popular geographical text-books. He was for some time professor of physics in the Virginia military institute, and later held the presidency of the University of Alabama. He died at Lexington, Va., 1873.

In 1778 a chain was stretched across the Hudson from West Point to Constitution Island. Several months ago a lot of old iron was sold at auction by the government in the Brooklyn navy-yard; there were several pieces of chain, each link weighing 300 pounds and three feet long. Some collectors heard of it; one bought 5,000 pounds, paid five cents a pound for it, knowing that it was a part of the chain placed across the Hudson at West Point in 1778. He had an authentic history of the chain down to the time it was piled up in the Brooklyn navy-yard, where it had been for fifty years. At Tuxedo is the old forge where the chain was made. The iron came from the mines at Sterling, N. J. The dealer still has three sections of eighteen links each, and two detached links. The bars of which the links are formed are three inches in diameter. The narrow space between the sides of the links is four inches across and the space between the ends, inside the oblong, is thirty inches.

It appears that the chain was not passed by the enemy, as was the one stretched across from Fort Montgomery and Anthony's Nose in 1776. That was swept away twice by the river currents, and a third one was destroyed by the British in 1777, who went then as far up the river as Kingston. The West Point chain was much heavier than the one used at Fort Montgomery.

There are school gardens in England, at Hayle, near Farnham, where plots of ground have long been provided both for boys and girls, the former for the cultivation of vegetables, the latter for flowers. These gardens have been established for about twelve years, and the school-master, who is a successful amateur gardener, has had pleasure in teaching those of his pupils who desired to learn to cultivate these plots.

Recognizing the value of teaching practical horticulture in connection with schools, the Surrey county council first provided a series of lectures on gardening for school-masters and pupil-teachers; then plots of ground were obtained to be worked by the older boys. The first of these gardens, twenty-four in all—were formed at Banstead. The plots have been worked for two seasons; vegetables are grown, also a few flowers by those who want them, while a plot is set apart for the cultivation of hardy fruits. Each boy in the villages is provided with a set of tools, comprising, a spade, digging-fork, hoe, trowel, with sheds for their accommodation. Prizes have been awarded for the produce at some local exhibitions.

Chicago.

A number of the aldermen would like to cut down the salaries of some of the school officials of the city. The finance committee realizes that it has no power to fix the salaries of teachers and others employed by the board of education, but seems to think that it can make it extremely difficult for the board to get its allowance. It has threatened to tie up the appropriation unless the board agrees to a reduction of salaries. However, nothing will be gained thereby. The law requires the council to pass the bill within the first quarter of the year, and besides, says what the school tax should be, thus practically fixing the school appropriation. A reduction of salaries would simply serve to increase the board's bank account which is already more than sufficient to carry it through the year. The tax-payers would not be benefited thereby.

The "anti-faddists" so-called are indulging in a good deal of "wild talk" these days, though they are less agressive than they were last year. The possibility of a reduction in the salaries of teachers has roused them from their slumber. They have an idea that the city might reduce its expenses by dropping all special teachers who according to their reasoning "have no place in the school at all." They will find it hard to convince the people in view of the fact that the school appropriation remains the same, whether their plan is carried out or not.

Progress in English Schools.

The education department has recently issued a circular to its inspectors impressing upon them the need of a reform of the system of education now pursued with the younger pupils in the upper schools. As it bears evidence of the awakening in England to the advantages of methods long at work in the best American schools we reproduce it here in part:

"Object lessons are to be treated as a means for mental exercise and not merely as opportunities for imparting miscellaneous information. Objects should always be present, and in sufficient numbers; and the chief aim should be to call into activity observation and the construction of clear mental pictures, so that the intelligence of the pupils may be exercised and developed. Geography, where it is a class subject, should be treated in a similar way, and should be taught by visible illustrations and by actual modeling in sand and clay, for the production of miniature rivers, mountains, etc. Tales from history also, if graphically told and well illustrated by striking pictures of sufficient size, will be very helpful in the same direction. Elementary science is obviously an excellent class subject from this point of view.

But, whatever may be the method followed, some system of lessons should be arranged in every school by which an intelligent habit of observation and simple reasoning may be fostered, while it cannot be too clearly pointed out that all the subjects simultaneously dealt with in a curriculum should be kept as closely interconnected and made as mutually helpful as possible, and not be unduly isolated and specialized.

So also as regards hand and eye training, it is much to be regretted that the ingenious and progressive kindergarten exercises for training pupils in deftness of hand and correctness of eye should be almost entirely discontinued after children leave the infant school; and the more so when it is remembered that the mind itself is most effectively trained by such exercises, whenever they are the expression of the children's own thought.

Drawing with colored chalks, modeling in clay, embroidery of outlines, formation of geometrical patterns and models, and building with cubes, etc., have been tried with excellent results and at very small cost, as convenient methods of continuing the instruction given in the infant school.

As regards the elementary subjects, spelling, unless founded upon methodical and well-graduated lessons on classes of words, should be absolutely discouraged in the lower classes; and in arithmetic, no sums should be set either in the first or second standard which the scholars themselves cannot either put down when set in a concrete form or translate into concrete qualities when set in abstract numbers.

The use of the reading book for spelling lessons should also be discouraged. Otherwise the interest in the subject is lessened, and the time which should be devoted to intelligent conversation between the teacher and the class on the matter of the lesson is curtailed.

In connection with object lessons or other similar instruction, the practice of answering by complete sentences, which largely prevails in infant schools, should, whenever possible, take the place of elliptical or simultaneous answering.

Attention might be also usefully drawn to the desirability of employing, in these lower parts of schools for older scholars, women teachers who have had experience of infant teaching, and especially those who have been trained for kindergarten work.

It should never be forgotten that, unless the lessons themselves are made attractive to these young children by their simplicity of treatment, by the suitability and variety of the illustrations, and by association with their every-day life, the most carefully drawn curriculum, and the most thoughtful arrangement of time-tables will fail to attract the children of those parents, who set little value on the education of their children."

Colorado.

State Supt. J. F. Murray has sent out a circular address which sets forth the condition and needs of the school system in a way that leaves no doubt as to his intention to do all in his power to stir up the people to the realization of necessary reforms. Some of the defects in the system as pointed out by him are:

"First—The attendance is too small and too irregular. Many children leave school at much too early an age.

Second—The school terms are too short on the average, and there is too great inequality of length in different districts, even in the same county.

Third—The teaching force is too frequently changed, consequently too largely incompetent in professional skill.

Fourth—Few of our rural schools are properly equipped or housed.

Fifth—There are too many schools according to population.

Sixth—The local management and direction of the schools is not at its highest practical efficiency. It should be intelligent and vigilant, and in order to be this it must be permanent and directly responsible for results."

Supt. Murray's words regarding the certification and employment of teachers are particularly noteworthy. They strike at the root of all defects. He says:

"What shall we do with our non-progressive teachers? There is a class of teachers who, while maintaining a certain minimum grade of scholarship, are without the progressive professional spirit which characterizes the true teacher. It is an undisputed fact that there are teachers whose first school is their best school. This is accounted for from the fact that they get a poor third grade certificate and are too indolent to reach higher. They vegetate, as it were, become stationary, have no self-life. Like a tree, they give shade when the sun shines and scatter moisture after rain; they have nothing good of their own to offer; all that comes from them is from another source. They parrot-like repeat book rules and owl-like hear pupils recite book lessons.

I would suggest that when a teacher comes for a third certificate and cannot get beyond the third grade, he be dropped from the work. The state board of examiners have made it possible to secure a life certificate for common school work. It is but a step from the first grade county certificate to it. This ought to be some inducement for live school teachers to keep moving upward

I do not believe it is right to say to men who have a university education and who have spent a lifetime in professional work: 'You must enter upon a five years' apprenticeship if you come to Colorado.'"

Referring to the irregular attendance of children he says:

"The causes of the small, irregular attendance might be summed up as follows: A financial system which compels young children to earn their own living, dull and uninteresting schools, and a state law which allows districts to be organized without enough pupils to make a good, wide-awake school. There are scores of districts in Colorado where the entire school population consists of five pupils. Unless there is a school population of more than twelve pupils, the children should be conveyed to another district each morning and taken home each evening at public expense, more cheaply than to conduct a school in their own district. Besides this the increased number at at the other school would add vigor and zest to all, and much good would result. There are many schools in the state whose average attendance is less than three pupils. Generally, in such cases, some little girl in the neighborhood is selected to keep the school. The teacher should be at home under the mother's guidance instead of attempting to guide. As a consequence the blind lead the blind and both fall into the ditch, and the school is a dismal failure."

Sussex County, Del., Teachers.

The most successful annual institute ever held in the county was that of two weeks ago. Supt. Tammany's stirring opening address was received with applause. Mrs. Mary F. Lowell, who is state superintendent of scientific instruction of temperance, of Pennsylvania, gave a practical talk on the method of teaching physiology. She interested her hearers in the work of Mrs. Hunt, of Boston, and the W. C. T. U., and called attention to the helpful books published by them. The old and tried friend of the teachers, Supt. Henry Houck, of Pennsylvania, followed with a talk on "How to Make the School-Room Cheerful." Supt. Joseph S. Walton, of Chester county, Pa., gave a helpful address on "A Golden Key." The key, he said, was "attention;" the lock which it is to open, "the mind." He gave many practical suggestions for the work in the school-room. Mrs. Lowell again took the platform and urged the organization of Bands of Mercy in the schools. The second day's session opened with an address by Supt. Walton on "Imagination." He showed that there are two kinds of attention: one creative, the other constructive. The cultivation of the imagination of children was treated in a way that teachers appreciate. The subject, "Should Examinations be Made the Sole Test in Making Promotions," was open for general discussion. Among those who took part in it were Prof. Jones, of Georgetown; Prof. Henry Clay Jones, of Milford; Prof. John A. Collins, of Milton; and Prin. S. E. Bishop, Miss Hallet, and Miss Macklin, of South Milford.

The afternoon session attracted 650 persons. Supt. Walton discussed "The Will." Supt. Houck followed with an eloquent appeal to the teacher, to make a study of their profession.

Prof. Green, of the West Chester, Pa., state normal school, gave an address that took his hearers by storm. Supt. Houck followed with a sparkling talk on the three R's which, he said, some people believed used to be the only branches taught in the old school, though he remembered that in the halcyon days of his youth the branch from the orchard was an important one with his teacher. He brought out some solid facts about thoroughness. Dr. Raub, well known as an author of text-books, had chosen "Training to Think" as the subject of his lecture. He made a strong plea for the need of arousing the pupil's self-activity. Mechanical machine work should have no place in the school-room. The pupils must be taught to think. Mere verbatim recitations do not build up the mind.

Prof. Green's talk on "The Teachers' A B C's" turned attention to some of the foundation principles of teaching. "A," he says, "stands for aim Every teacher should have some aim in his work. The aim of education should be to develop the possibilities of the pupils. "B" means bravery; to have a right conviction and be brave enough to teach it. People who are behind time oppose new methods, and bravery is required to meet the opposition. Supt. Tammany, to whom the success of the institute is largely due, made the closing address.

The Scientific Method With Children.

(This subject is discussed by Henry Lincoln Clapp in the November *Popular Science Monthly*. The following selections from the article are reprinted here to give our readers the benefit of some of the valuable suggestions offered there.)

At a recent meeting of prominent educators in Boston to consider means of promoting work in elementary science, a well-known professor of science said that there was danger that college professors would make out a scheme for teaching science, and impose it upon the elementary schools; that the work was likely to be begun at the wrong end.

This led another member to say, that not a little danger was to be apprehended from the scientists themselves, because many of them taught as if the scientific method demanded that they should begin with the ultimate undecomposable constituents of things. There was danger that they would hold to their own conception of elements, and ignore the child's conceptions.

No method of teaching whose departure is not definitely known can be called scientific. So far as it fails to interest children, to make them use their own senses in the best manner, to make them think best in their own way, and to develop them best by means of their own activities, so far it fails to be scientific. The child's way of working is, or should be, different from the adult's.

The basis of instruction in elementary science must be the child's natural method of working upon his own elements, the things that are simple to him. His elements, in science, are what he knows at first hand, through the medium of his own senses—*superficies, externals*—not internals, anatomy and remote elements.

The science of teaching demands full recognition of an adequate *presentation* of the subject to be taught. The best presentation of a thing is made by the thing itself, which must be suitable for the grade in which it is used, being simple in form, color, and parts, for low grades—not necessarily of simple or regular form, nor of one color, nor of two parts. "The presumption of brains" must apply to the youngest pupils of school age. Experience shows that pupils who are permitted to draw and describe in writing simple, natural objects, guided only by a very few words written on the blackboard, acquire such a habit of application and power of expression as can be developed in no other way as well or as soon. They are so pleased with the expression of their own ideas when they have been well started, that the disposition to appropriate other persons' ideas to save themselves from thinking, or to copy the expression of them is counteracted. Their most imperative needs are *opportunities to work by themselves, skilful guidance, and generous encouragement.*

The part that language takes in the plan should now receive brief consideration. The pupil being accustomed, from the time he begins to write sentences, to describe in writing what he himself sees, recognizes the connection between his ideas and their signs on paper. His facility in expressing his ideas more and more correctly increases; and when his work is criticised, he is in the proper mental attitude to assimilate the criticism. By examining the pupil's work, after his first essay on a new subject, the teacher gets at the defects in the pupil's vocabulary at once, and sees just where to help him. In no other way can the teacher reach that point so soon. The pupil being left to himself, he must describe the object in his own words, and he will not use any that he does not understand. The teacher helps only where help is needed.

Up to this point, all information not obvious in the specimen is rigorously excluded. Information must be divorced from observation. No other course can be followed safely by the rank and file of teachers. The pupils having had the opportunities required for observing, thinking, and recording for themselves, and a substantial basis for information having been thus laid, individual experiences, reading from books, and reasons, causes, and results are considered, and the whole, observation and information, is incorporated into a composition, most carefully written, during the time devoted to language work. The power thus developed in the lower grades enables pupils in the higher grades to stop with first drafts.

When winter begins to wane, it's time to take a spring medicine. Try Hood's Sarsaparilla.

New York City.

The board of education has made an effort to get the consent of the city authorities to the bill introduced in the legislature providing for an appropriation of $2,500,000 in bonds in addition to what has already been given. Their request has been referred to the controller. Four hundred thousand dollars were to be applied to the building of a new hall for the board, but the mayor refused to give his sanction, saying that no money should be given for this purpose "until every child in the city who can go to school has been provided with proper accommodation."

The building occupied by the University of the City of New York will not be removed from its site on Washington Square, as was at first suggested, but will be remodeled and made several stories higher. It has been decided to preserve its architectural character as far as possible. The School of Pedagogy will have its quarters in one of the upper stories.

In New York City an association was started some time ago, which has the dual object in view: (1) To teach the poor children of the tenement districts the primary rules of horticulture; and (2), to promote friendly relations between the wealthy and poorer classes. In the time that has elapsed since its organization, the association has been doing much work in the kindergartens of the Children's Aid Society, New York, Free Kindergarten Association, Hebrew Kindergarten Association, and those controlled by several other charitable societies. The teachers of these schools have been in sympathy with the movement, and have given it their hearty support. Last spring the efforts of the association succeeded in enlisting the interest of the New York Florists' club Mr. Albert Manda, of Short Hills, N. J., the president of the club, took an active part in bringing the children of the free kindergartens to the flower show then in progress, and after they had seen the blossoms on exhibition, he presented each one with a small plant or cutting. These were cultivated and exhibited at the flower show held a few months ago. Prizes were awarded, and much pride was displayed by the amateur gardeners at the results obtained. Next spring the Florists' club will give more cuttings.

Miss Isabel McElheny of this city was the first to suggest the organization of the association, and her work was heartily supported and endorsed by Mrs George J. Gould, Mrs. Theodore Sutro, Mrs. Alice Wellington Rollins, and others interested in the work. Mrs. Gould is the president, and Mr. William R. Worrall, the treasurer.

Teachers' Association Meetings.

FEB. 20-22.—Department of Superintendence, N. E. A., Richmond, Va.
FEB. 22.—Tuskegee meeting of officers and teachers of colored schools, at Tuskegee, Ala.
MARCH 3. —New York Second Commissioner's District Teachers' Association at Rosedale. Millard W. Baldwin, president; C. V. Ryon, secretary.
MARCH 9-10.—Southern Minnesota Association at the normal school, Mankato.
March 16-17—Western Washington Teachers' Association, at Tacoma, Wash.
March 23-24—Central Illinois Teachers' Association, at Normal, Ills.
March 28-31—North Nebraska Teachers' Association, at Columbus, Nebr.
MARCH 27-28-29.—Ontario Educational Association. Thirty-third annual convocation to be held in the Education Department buildings, Toronto. Officers: president, Alexander Steele, M.A., Orangeville; vice-presidents, S. F. Lazier, LL.B., Hamilton; I. J. Birchard, Ph.D., Toronto; A. McMillan, Toronto; T. Kirkland, M.A., Toronto; Arthur Brown, Morrisburg; Miss Laidlaw, London; secretary, Robert W. Doan, Toronto; treasurer, W. J. Hendry, Toronto.
MARCH 29-30.—Wyoming State Teachers' Association, Rawlins.
APRIL 4-6.—Indiana Southern Association, Rockpoint.
APRIL 5-7.—Northern Indiana Association, Frankfort.
APRIL 5-6-7.—Joint meeting of the Northeastern and Southeastern Kansas Teachers' Associations.
April 5-6—North Western Wisconsin Teachers' Association, Menomonie.
April 6-7—Massachusetts Association of Classical and High School Teachers, at the Boys' Latin School Building, Boston.
May 4-5—Fairfield County Teachers' Association, at Bridgeport, Conn.
JUNE 19-21.—Missouri State Teachers' Association at Pertle Springs, Warrensburg; Pres. Henning W. Prentis, St. Louis, Mo.
June 26-27-28-29—Ohio Teachers' Association, Delaware, Ohio.
JULY 6-13.—National Educational Association, most likely at Duluth, Minn.
DEC. 26-27-28.—South Dakota Educational Association, at Huron. Pres., R. S. Gleason, De Smet; Rec. Sec'y, Kate Taubman, Plankinton; Corr. Sec'y, I. F. Nickell, Huron; Treas., Harry L. Bras, Mitchell.

Leading Events of the Week.

The great majority of the business men of India are pleased with the action of the Bengal chamber of commerce refusing to re-open the mints to the coinage of silver.——Death of Steele Mackaye, the noted playwright and actor.——The British house of lords, under advice of Queen Victoria, recedes from some of the amendments of the parish council's bill.——The attempt to pass Mr. Bland's silver bill resulted in very disorderly scenes in the lower house of Congress.——The death of Joseph Keppler, the noted caricaturist and the owner of *Puck*, took place.——There are more indications of better times, for the factories are starting up in different parts of the country.——The Wilson tariff bill is still in committee, but will probably be reported to the senate very soon.

A Great Secret

underlies the principle that has brought success in the production and sale of the Gail Borden Eagle Brand Condensed Milk, and this partly accounts for the fact that competitors do not successfully imitate it. Thirty years in the lead.

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Correspondence.

What is a Prime Number?

In looking up the definition of A PRIME NUMBER, as given by a number of mathematical authorities, one i almost led to ask, "*Is* there such a class of numbers as the PRIME NUMBER, and, if so, *what is it?*"

If definitions are to be taken to mean what their component words indicate, as they appear upon the pages of the several arithmetics in question, the Prime Number, if it exists, is a nondescript, the correct definition of which is to be decided by the coming mathematician.

That mathematicians have, in no inconsiderable degree, recognized the difficultness of defining this class of numbers, is evident from the marked changes in the definition as given in successive editions of the same arithmetic (notably in Ray's "Practical") and in the works of authors of recent date as compared with those of greater antiquity, of which the following are illustrative:

1. "A PRIME NUMBER is one that can only be exactly divided by itself and unity." —*Ray's "Practical," antedating*, 1850.
2. "A PRIME NUMBER can be exactly divided only by itself and unity." —*Ray's "Practical,"* 1857.
3. "A PRIME NUMBER has no factors." —*Ray's "Practical,"* 1877.
4. "A PRIME NUMBER is one that can be exactly divided by no other whole number but itself and unity (1)." —*Ray's "Higher."*
5. "A PRIME NUMBER is one which cannot be produced by multiplying any two or more numbers together, or which cannot be exactly divided by any whole number except a unit and itself." —*An ancient Thompson.*
6. "A PRIME NUMBER is one that cannot be resolved or separated into two or more integral factors" —*Fish's "Practical,"* 1863.
7. "A PRIME NUMBER is one that cannot be produced by multiplying two or more numbers, each greater than a unit." *Brooks'* "*Normal,*" 1863.
8. "A PRIME NUMBER is a number which is exactly divisible by no whole number, except itself and 1." *Dean's "Intermediate,"* 1865.
9. "A PRIME NUMBER is one that cannot be separated into integral factors." —*French's "Common School,"* 1865.
10. "A PRIME NUMBER is one that is exactly divisible by no number except itself and one." —*Towne's "Academy,"* 1867.
11. "A PRIME NUMBER is one divisible only by unity." —*Webster's "Dictionary,"* 1864.
12. "A PRIME NUMBER has no divisor except itself and one." —*White's "Complete,"* 1876.
13. "A PRIME NUMBER is exactly divisible only by itself and unity." —*Barnes'* (*Ficklin*) *National*, 1881.
14. "A PRIME NUMBER is one that cannot be exactly divided by any number, except a unit and itself." —*Thomson's "Complete,"* 1884.
15. "A PRIME NUMBER is one that cannot be divided by any other except unity without a remainder." —*Wentworth's "Grammar School,"* 1890.
16. "A PRIME NUMBER is a number that has no integral factors except itself and unity." *Robinson's "Shorter Course,"* 1874.

Of definition 1, Holbrook in his "Methods of Teaching," says: "Since every number can be exactly divided by every other, with either an integral or fractional quotient, there is no prime number according to this definition."

Of definition 3, the same author says: "Since every whole number will exactly divide every other number whether fractional or integral, there can be no prime number according to this definition."

Again, of definition 4, Holbrook says: "Since every number can be produced by multiplying itself by unity, or some integral number by some fractional number, there is no prime number according to Thompson."

As each of Holbrook's criticisms applied as forcibly to the inaccuracies in one or more of the other definitions, further criticism is unnecessary.

That the "exact science," should be handled in such a "cut and try" manner, seems worthy of comment, at least.

Closing with Holbrook's definition: "A PRIME NUMBER is an integral number which can be divided by no other integral number than itself and unity without a fractional quotient." I remain,

Yours for better definitions,

Kansas City, Mo. G. T. JOHNSON.

Another Way.

The article on percentage in THE JOURNAL of Dec. 23, interested me very much. I divide the process into three parts: (1) What *P.* is. (2) Its representation. (3) Other forms turned into *P.* forms.

(1 & 2) I use the silver dollar and copper cents very briefly; then I turn to a stick of wood which is divided into 100 inches. (I use other things, but the stick is my main reliance.) I think it important to have something that can be *handled* as well as *seen*. A pupil stands at the blackboard, holds the stick and writes, for example, 7 inches = 7-100 = 7 per cent, and so on; then another, and another.

(3) Then a yard-stick is used; a pupil points out, for example, 7 inches =7-36 = 7.00-36 = 19 16-19 per cent.

Of course, before this he learns that 1=1.00 2 = 2.00, that is that 1 unit is one hundred hundredths, and so on, so that the form = 7 00-36 is understood.

After this other forms are changed: ½=1.00÷2 = .50 = 50 per cent.; 1¾ = 7÷4 = 7.00÷4 = 1.75 = 175 per cent

Then 100 panes of glass (there being that number in the windows) are chosen and various problems proposed, as 7 are broken; 11 are broken, etc. Then 20 marbles are brought in. E. M. RICHMOND.

New York.

Still Another.

To teach percentage and have it *understood* is not easy. I used to think I did it when the definitions were learned. Now I make it as objective as possible.

A jar of 100 beans is brought in and ten taken out, for example. A pupil writes ten beans=10-100=.10=10 per cent.; thus many examples are written They learn that 10 per cent. means ten *hundredths*.

But 10 per cent. of 37 1-2 is not so easy of comprehension I found. I turned out 50 beans and proceeded. A pupil writes, 10 beans is 10-50=1-5 =100-5=20 per cent. I give particular attention to the form 1.00-5, showing that *hundredths* have now been reached. I have taken the form 10-50 and doubled both terms=20-100 Any way to get it to hundredths. Then 11, 12, &c., are taken out and turned to hundredths.

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Then the jar is reduced to 25 beans and problems given; then 75 and problems given; then 40; then 60; then 49 and so on.

Then the pupils in the class (34) are used as a base; four are sick; or five are late &c. In my experience it is easy to leave a dull, confused idea of percentage in the minds of pupils. G. BECHTER.

Weytown.

The Use of Blocks.

I had 100 small blocks made, and piled them up in a square form on the table, and gave problems in representing 10, 20, 30, 40, 50, 60, etc., thus 10 are 10-100 = 10 per cent., telling them that *per cent.* is only another name for hundredths. Many problems followed.

Then I took 50 blocks, and they learned that 5-50 = 10-100 = 10 per cent. and so on. Then I took 25 blocks, and gave problems.

Next, I selected 18 blocks, and said here is 2; that is 2-18 = .11 1-9 I do not carry the division beyond two figures, for two give hundredths which is what I want. Four blocks are .22 2-9 or 22 2-9 *hundredths*, or 22 2-9 per cent.

After this follow such problems as, A man had 24 sheep and sold 4 per cent., 6 per cent., 11⅓ per cent., 12½ per cent., etc.

Springfield. A. F. EMERSON.

The Lyceum has been debating the causes of the hard times. After a very interesting paper had been read by a young lawyer, showing that it was due to the fear that the tariff would be reduced, a stranger from your city made a different statement; he put the case very strongly too; he said it was a social question entirely and not a political one. Will you state what the cause is, regarding it as a social matter? T. E. BARNS.

Oxford.

There are several causes undoubtedly of the hard times: The silver purchase aided in the great stringency in 1893; the fear of reduction in the tariff makes many manufacturers hesitate to continue their mills, but behind these there is another cause, which may be termed the social cause. In a nutshell it is that the bulk of the American people have for t e past ten years been living beyond their means. As soon as this pinch is over they will go at it again The puplic school has a great deal to do with the matter The children of the poor want to dress as well as those who are better off; learning to read they find in the newspapers the fashions that cost much money and the fine things in furniture; the wonderful things that may be seen by traveling. All this has cost money; all are in debt; all must economize and get out of debt, and if possible learn lessons; the parents will, but it is not likely that young America will. In about ten years there will be another season of hard times.

What is the object of the society known as Manual Training Teachers' Association of America? How can I get hold of a copy of their constitution? R. SVENSON.

The purposes of the association, as indicated in a previous number of THE JOURNAL, are to secure coöperation in study and experiment; to gather and to disseminate information regarding the principles, progress, and development of manual training, and to promote the professional interests of its members. At a meeting of teachers the plan and scope of the association was discussed and a committee on constitution appointed. The constitution prepared was adopted later by those attending the International Congress on Education at Chicago

The officers of the association, Geo. B. Kilbon, Springfield, Mass, M. T. S., president; Geo. S Waite, Toledo, Ohio, M. T. S., vice-president; and Geo Robbins, Frankfort, Ky., M. T. S., secretary and treasurer, constitute the executive committee, which is now at work making arrangements for a summer meeting. A copy of the constitution, with fuller particulars, will be sent to any one interested upon application to any of the officers.

THE SCHOOL JOURNAL, Dec 23, in "Lessons in Number," presents the "Unit similarity" method of teaching percentage; another is the "Fractional unit plan." I prefer the *Analytic and Equation Method*. What is 25 per cent. of 48 desks?

100 per cent. = 48 desks.

1 per cent. = 1-100 of 48 desks = .48 desks.

25 per cent. = 25 × .48 desks = 12 desks.

Here base is given, and 25 of the 100 equal parts. The moment the pupil realizes that the base is divided into 100 equal parts—one of which is 1 per cent., his old train of thought at once runs to analysis.

If 25 per cent. of a number of desks is 12 desks, what is the number? 25 per cent. = 12 desks.

1 per cent. = 1-25 of 12 desks = 1 2-25 desks.

100 per cent. = 100 × 12-25 desks = 48 desks.

12 desks are what per cent. of 48 desks? 100 per cent. = 48 desks.

1 per cent. = 1-100 of 48 desks = .48 desks.

12 desks ÷ .48 desks = 25 times.

∴ 12 desks = 25 per cent.

There will be no confusion in percentage till this last equation of the last case is reached. Nor is this, even, confusing. 1 per cent. = .48 desks; then *every time* there are .48 desks in 12 desks, 1 per cent. is found. There are .48 desks in 12 desks 25 *times*; therefore 12 desks = 25 per cent. The division sign (÷) is always translated "every time."

Another solution of the third case is as follows: 48 desks = 100 per cent.

1 desk = 1-48 of 100 per cent. = 100-48 per cent.

12 desks = 12 × 100-48 per cent. = 25 per cent.

This goes directly for the missing element, and I must confess that I am prejudiced in its favor, having used it until the yearly combined testimony of teachers and pupils led me to conclude that the indirect method is easier to the beginner; and the beginner is the one in whose interest this is written.

Birmingham, Ala. J. B. CUNNINGHAM.

New Books.

Teachers of the language of the ancient Romans are so well acquainted with the characteristics of the Students' Series of Latin Classics that we hardly think it necessary to call attention to them. In this series has been issued *A First Book in Latin*, by Prin. Hiram Tuell, A. M., of Milton (Mass.) high school, and Prof. Harold North Fowler, Ph. D., of the Western Reserve college. Its vocabulary has about 700 words, and the greater part of it has been selected from the first four books of the "Gallic War." Indeed, nearly every word that Cæsar uses six or more times in these books will be found here so that the student who has mastered this vocabulary will find himself familiar with eighty five per cent. of the words on an average page of Cæsar's history. The words are used in three successive chapters, and often throughout the book in order that the student may become thoroughly familiar with them. The illustrative sentences precede the rules of syntax, and contain in all cases only words found in the exercises. The development of the verb is slow, and carefully graded with reference to the difficulty of acquirement. Among the other features are carefully graded reading lessons, containing the story of the first book of the "Gallic War." (Leach, Shewell & Sanborn, Boston, New York, and Chicago. $1.00.)

Part II. of the *Supplementary Work in Arithmetic*, by William M. Giffin, vice-principal of the Cook County normal school, treats of the practical and interesting subject of area. Treated the way it is in this book we do not see how it is possible for any pupil to fail to understand the subject. The author reminds the teacher how necessary it is to impress on the child that finding the area of any figure is simply finding the number of square units on its surface. If they are told to multiply four inches by three inches "they at once infer that inches multipled by inches gives square inches, which is just as absurd as to say that eggs multiplied by eggs will give *square* eggs" This book is arranged on the idea that mensuration is a subject that may be taught at the first, instead of waiting until the eighth year of school. It has numerous diagrams to be used in connection with the problems. (A. Flanagan, Chicago. 40 cents)

Dudley G. Hays, Charles D. Lowry, and Austin C. Rishel, teachers of physics in the Chicago high school have prepared a *High School Laboratory Manual of Physics* The purpose in making the book was (1) the teaching of physics by the inductive method, that is, the presenting of a logically arranged course of experimental work that shall cover the ground of elementary physics, (2) the providing of sufficient laboratory work to meet the requirements of any college in the country. It is supposed that boys and girls may, after sufficient directions, learn from nature first-hand many of her great laws. The three steps to keep in mind are careful manipulation, accurate observation of phenomena, and logical deductions or generalizations. Blank pages are left for notes which should be neat, terse, and in good English. (Ginn & Co., Boston. 60 cents.)

One of the volumes of Modern Language Classics now being issued contains extracts from the *Bildern aus dem Mittelalter*, by Gustav Freytag, edited, with introduction and notes, by A. B. Nicholas, instructor in German in Harvard university. The selections contained in this book refer to Charlemagne, the crusades, and cloister life in the tenth century. They are among the most charming productions of this famous German author, and, consisting mostly of simple and direct narrative, are better suited to the needs of second year work than those which are more occupied with abstract discussion. The aim is to encourage rapid and intelligent reading rather than minute study of the text, and the grammatical and philological notes have therefore been reduced to the minimum. (Henry Holt & Co., New York.)

A very handsome small quarto volume by Irene A. Jerome, bears the title *I Have Called You Friends*. The pages are printed on thick, smooth bristol-board in fancy type of various styles in black, gilt, and colors Throughout the book the flower designs are of pansies. The selections of verse and prose all relate to friendship. The edges are gilt and the covers beveled. The front cover has a handsome design of pansies and gilt, with colored lettering. (Lee & Shepard, Boston.)

No. 34 of Denison's collections of *Scrap-Book Recitations*, collected by H. M. Soper, professor of elocution at the Chicago atheneum, contains much valuable material for school and other entertainments. Newspapers, magazines, etc., have been drawn upon for these pages and the result is a very bright and readable volume of short pieces of prose and poetry. A large proportion of good humorous selections is noticeable. Many of these pieces have been recited with success by pupils and others, so there is no doubt of their value. (T. S. Denison, Chicago. 25 cents.)

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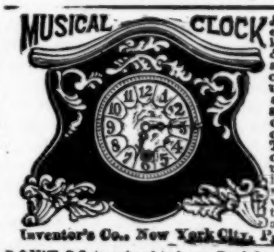

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General Notes.

The report for 1893 demonstrates the increasing popularity of the Mutual Life Insurance Company of New York and shows the benefits conferred on those holding its policies. The assets of the company are now $186,707,680.14 and the liabilities $168,755,071.23. The surplus fund for the payment of dividends and to insure the policy-holders against every possible future emergency amounts to $17,952 608 91. During 1893 the policy-holders of the company received $20,885,472.40 against $19,386,532.46 in 1892. The Mutual Life now has policies in force insuring $803,284,738.46. Such a result secured during a period of wide financial disaster and general business depression is remarkable.

It is not reasonable to expect that the boys will all become Patrick Henrys or Daniel Websters or Edward Everetts, but it is wise to give them a chance to develop what oratorical power they possess. This may be done by elocutionary attempts; the pupils take up the work with enthusiasm when it is presented to them in the right way. Branch's National Speakers of Baker & Taylor Co., New York, furnish good selections for speaking for different grades of pupils.

The average boy has a great deal of superfluous energy, which he must use up in play, mischief, or work. Get him to work under such conditions that he thinks it a pleasure and you have solved the problem of his most rational development. Manual training schools are doing this. Many of them are using the foot and power machinery of W. F. & John Barnes Co., including lathes for wood and meal work, scroll saws, circular saws, etc.

Do any of us work for the sake of working? By no means. The earnest, conscientious teacher seeks to do as much good as he can, but he is always glad when pay day comes around. The beauty of it is that those who seek to do the most effective teaching are usually the ones who are asked to come up higher. They are those that the agencies, like the American and Foreign Teachers' Agency, of Mrs. M. J. Young-Fulton, 23 Union Square, N. Y., like to help. They can hasten matters by communicating with the agency; some people are too modest to make their merits known.

Who does not cherish a badge, pin, or other memento of school days? The memories of old friends and old times clustering around it are dear. Such reminders of old times should be handsome and tasteful, like those made by E. R. Stockwell, 17 John street, N. Y. From designs he makes pins or rings, buttons, badges, medals, etc. He will gladly furnish information to inquirers.

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There are many reasons why one should study Latin, for culture, for information, for knowledge of roots of English words, etc. So many other things are to be learned at this age of the world, however, that it is necessary to economize time. This can be effected by the use of A. Lovell & Co.'s Parallel Edition of the Classics, consisting of the originals and translations arranged on opposite pages. In these are included the First Four Books of Cæsar's Commentaries, the First Six Books of Vergil's Æneid, and the Select Orations of Cicero.

Give the boy who is going to follow a trade a good start by sending him to a trade school. The existence of so many of these schools shows that there is a strong demand for them and that they are doing good. Of course they must have tools and machinery. Hammacher, Schlemmer & Co., 209 Bowery, N. Y., make tools especially for schools and furnish them at special rates.

Anna M. Spollen, principal of the McClelland school, Philadelphia, says of Pollard's Synthetic Method of Teaching, Reading and Spelling: "To my mind it is the greatest need of the age; this power attained by pupils to pronounce new words without the teacher's aid." Supt Gault, E. S. Loomis, principal of Baldwin university, Berea, O., and others also testify to its merits. Full information in regard to it may be obtained of the Western Publishing House, 358 Dearborn street, Chicago.

The question of what books are best for supplementary reading is one that is agitating the mind of many a teacher. The books should certainly be instructive, and those that treat of subjects in which the children are interested. The volumes of the Young Folks' Library of Silver, Burdett & Co., answer this description. The stories of Child Life include four volumes. At Home, At Play, In the Country, and At School. The World and its People is a series of graded geographical readers in five volumes—First Lessons, Glimpses of the World, Our Own Country, Our American Neighbors, and Modern Europe.

A certain added interest attaches to books issued anonymously from well-known publishing houses. They, of course, are not often editorial utterances but they seem to carry something of the importance of editorial opinion, backed by the successful books that have preceded them. In the January *Harper's* appeared a strong unsigned article on "The Mission of the Jews." The writer is the author of the volume on *The Jewish Question*, which will be published by Harper & Brothers about March 16. He or she prefers to remain anonymous for a time at least, but the subject and its sympathetic treatment at an opportune time like this ought to provoke enough discussion to reveal the author's identity.

Mrs. Van Rensselaer has written an article on the Madison Square Garden of New York, which appears in the March *Century*. She thinks that the architects have made a tower which is much more beautiful than its prototype, the Giralda tower at Seville. The Giralda tower is in two distinct parts, separated from each other by nearly four centuries of time, and just as widely by disparities in style. Mrs. Van Rensselaer considers the New York tower from base to crown a consistent and harmonious piece of work. Its general scheme—its outline and a portion of its main parts—is borrowed from the Giralda. The latter is 275 feet in height, but the New York tower is 350 feet in height to the points of Diana's crescent. The Giralda tower is not attached to a building, but stands alone. The tower of the Madison Square Garden rises from a long façade 60 feet in height.

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A friend of Jerome K. Jerome told him, after reading "Novel Notes," that the story of a woman who was crushed to death by a python was "not as funny as some of his other things." (He might have added that it was not as new.) Similar experiences have led Mr. Jerome to say, in the preface, that three of the tales in "John Ingerfield, and Other Stories," soon to be published by Henry Holt & Co., are "not intended to be amusing." He designates the three in order to avoid confusion.

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